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SPECIAL GRAPHICS ISSUE!

Volume II Number 5
November, 1982
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the RAINBOW

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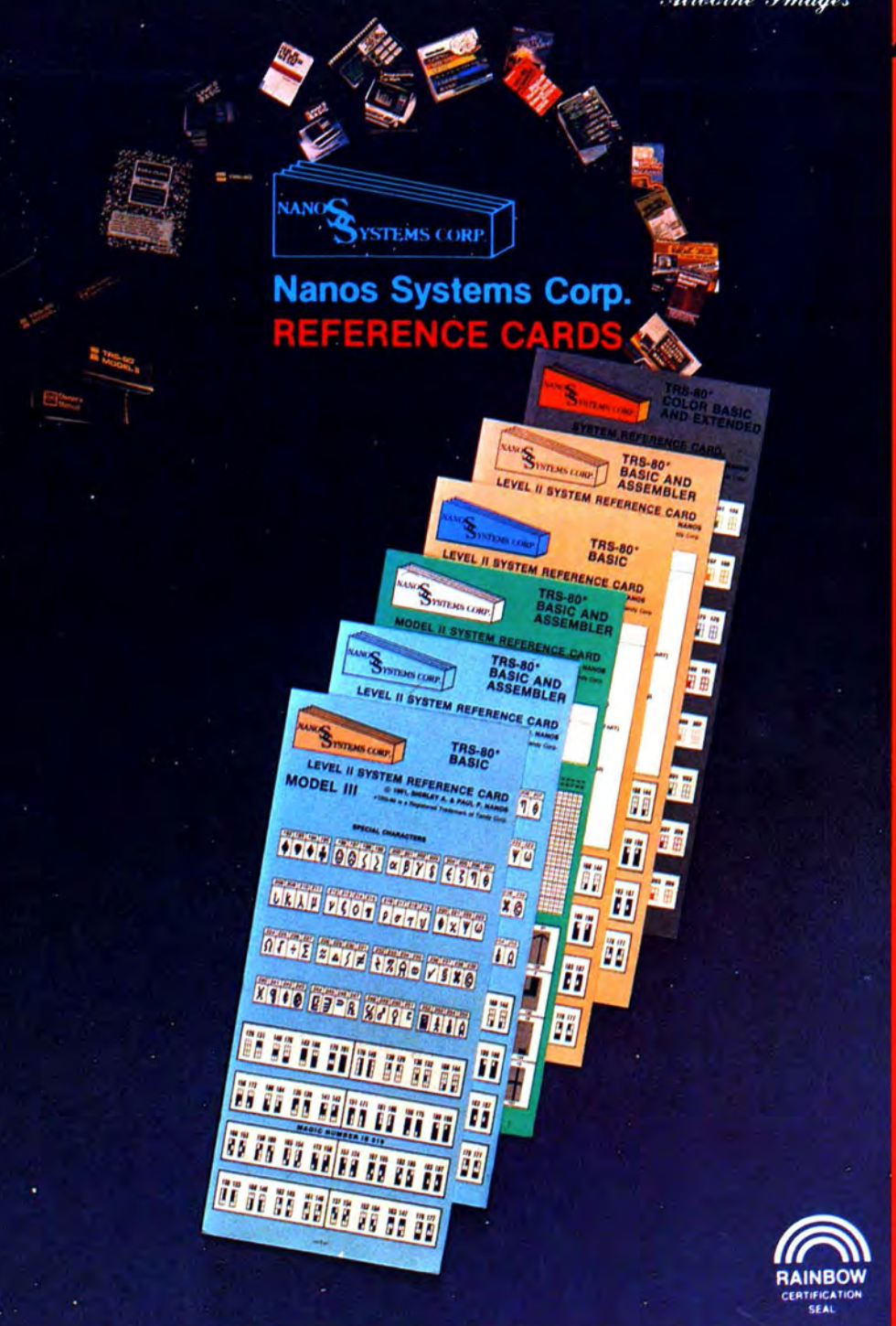
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COVER illustration done by Computerware's new Foxy Graf drawing program. Photo by Jim Reed. Separations by Kelly Color Service.

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The RAINBOW is published every month of the year.

LETTERS TO RAINBOW

PIRACY

Editor:

I was really pleased to see the editorial you printed on piracy. The ideas you presented make a lot of sense and I hope the rest of *the Rainbow's* readers will join you in this effort.

By the way, I see you are making your own contribution to limiting piracy on a personal level. It used to be easy to Xerox *the Rainbow* because it really wasn't that hard to do with only 50 or 60 pages. Now, it is just too much trouble to make copies of all those pages!

Anthony Jenewine
Wilmington, NC

ROM PACKS

Editor:

Thank you for running my *Videotex Rompac Save* letter. I have a couple of additional comments:

—The addresses 285-337 will *not* work with Extended Basic. They should work with non-Extended Basic, though.

—Before loading the Basic driver program, you should *PCLEAR 0* by *POKE*ing 25,6 and 31,6.

This will put the driver program at the beginning of ROM rather than on Page 4.

Jim Ali
St. Albans, WV

Editor:

In regard to the letter from Jim Ali in your August issue about Videotex Rompack saving of screen text, the method of disabling the Rompack autostart by placing tape over certain pins can be a sticky situation.

If you simply POKE &HFF23,36 *all* Rompacks do not start up and you remain in Basic, where you are free to examine or move the Rompack to RAM. The Rompacks start at &HC000 if you wish to inspect the contents. I think this method is easier and faster when one needs to disable Rompacks.

By the way, the changes in *Rainbow* are fantastic. Your publication is *the best* and the color adds so much, along with the type style, to the readability of our beloved magazine.

Steven Schechter
New York

SUGGESTIONS

Editor:

In the August issue you asked for comments about the direction of the future issue of the magazine. Here are mine:

1. Keep the game programs. They're simple but a lot of fun. They're one of the main reasons I subscribe.

2. How about an annual roundup of tips for the beginner. I'm a new subscriber but I've already learned about the CPU speedup and how to merge Basic programs from cassette. What other useful tips have I missed. An annual review would help.

3. I would be interested in seeing more mathematical and statistical programs.

I enjoy your magazine a lot. Keep up the good work.

David Finkel
Lewisburg, PA

Editor's Note: We are trying to repeat short hints and tips as "filler" space, rather than using all of it for things which may not be of use to readers. See a couple of examples in this month's issue. These will probably be repeated fairly regularly, as we are growing pretty quickly and "new" people will want to know these things—even more often than on a yearly basis. Of course, the back issues give all of the details and we still have most of them in some form. We're looking for more statistical and mathematics programs, too. How about some contributions.

SCREEN STREAKS

Editor:

I'm a new subscriber to *the Rainbow* and after reviewing my first edition I have to say that I am throughly, 100 percent delighted, nay, even ecstatic. All that info on the CoCo!

In response to the letter to the editor on *Heating Problems*, I was having similar problems. After 30 minutes use, my alphanumeric characters were turning ghosty and orange. I tracking down the source of trouble, I strongly suspected overheating, as the symptoms would be gone the next day or several hours after shut-down.

After doing some reading in the Radio Shack tech manual for the CoCo, I felt the problem could be the video mixer chip (U12), a Motorola MC1372. To test it I gently sprayed some aerosol coolant on the chip and the screen became clear as a bell and the colors absolutely vivid. I installed a heat sink and the problem has not returned.

Thanks for a *useful* publication.

Donald Siwek
Peabody, MA

Editor:

Your October issue arrived and in response to William Warren's problem with an upgrade:

I had the same thing happen to me, and if his trouble was from the same reason, the correction is just as fast.

The possible cause of a screen full of @@@@@@@ is that the jumper from the RAM upgrade might be attached to pin 36 instead of 35 of the SAM chip. The instruction sheet for the upgrade I got said to count from pin 40 (which is the first one on the right hand side) to pin 35 for the connection. So, I figured 35 from 40 is five and I counted five pins down. Wrong! It left me on pin 36. Moving the jumper to the correct pin put the total 32K into operation.

Still enjoy your magazine and look forward to its arrival each month. (Any chance you might go weekly?)

Robert Foiles
Lancaster, PA

Editor's Note: ***No!***

CLARIFICATIONS

Editor:

Circle City Software was extremely pleased with the fantastic review given one of our programs in page 96 of the October *Rainbow*. We hasten to add one point, however; the game, previously called *Startrek* has been renamed *Star Pilot*. The game as described remains the same, except that permission to use the copyrighted name was not received from Paramount in time to start production runs and the command decision was made to delete references to their fine series. The game still contains all the "bells and whistles" alluded in the review, but we wanted to bring this to your readers' attention.

The instruction booklet has been extended to make first time users more comfortable in the game.

Daniel Mickle
Circle City Software
Indianapolis, IN

Editor:

I would like to express my extreme displeasure with the quality of the review done on *Pigskin Predictions*. Mr. Schottland gave this highly acclaimed program such a superficial once over as to imply he never ran the programs. Perhaps he never did fully enjoy the program because he falsely stated that the package does not include the initial data as clearly stated both in the manual and on the program tape label (and directly accessable on disk).

He did your readers a great disservice as you and they will have to read the true review in the various other publications that

my customers choose to submit.

Wayne Diercks
Rainbow Connection Software
Minneapolis, MN

Editor:

I would like to point out two inaccuracies in the review in last month's *Rainbow* of the Cer-Comp Editor/Assembler package.

The review stated that our package does not support either a symbol table listing or a cross-reference listing. In fact, it does both.

The review also said you cannot stop the listing as it scrolls by. You can, by pressing any key.

While, with the inclusion of a powerful editor, I would disagree that this program is too expensive, your readers might be interested to know that the "summer special" of $49.95 has been made the permanent price for this fine package.

Bill Vergona
Cer-Comp
Las Vegas, NV

SAVING TAPES

Editor:

I am a new subscriber and I would like to say it's one of the best things to happen to the 80C.

I would like to pass on something that might help save some tapes. I had some tapes that were worn out and could not load the program to make a new copy. So, I played the tape player through a stereo equalizer and then from the equalizer to the computer. The equalizer can filter out certain audio frequencies and increase others.

Well, to make things short, by controlling the output I was able to load the tapes. Hope this can help.

Thomas Bailey
Fredericktown, MO

PRINTER INTERFACE

Editor:

I discovered (thanks to a comment made to me on the telephone by Dan Nelson at Nelson Software and then confirmed by Microware) that other day that the P180C printer interface from Microware has a pair of capacitors that may be changed to allow you to set the baud rate to 600, 1200 or 4800. Since the specifications for my Epson MX80FT printer gave 80 cps as its speed, I thought I would try the modification from the standard 600 to 1200.

With a little help from a friend, these capacitors were quickly changed and now, indeed, the printer runs a little faster. Epson tells me that the normal print speed including carriage returns is only 66 cps. However, it now has almost no delay before printing in the normal mode and seems to move a lot faster in the compressed mode.

Joe Cain
Golden, CO

BOUQUETS AND BRICKBATS

Editor:

Sitting here at my trusty 80C, I am both relieved and anxious. I am relieved because I have just reconstructed a 50 item data file which is crucial to our daily flight operations and anxious to tell you and your readers about the company to whom I owe a sincere vote of thanks.

I am a pilot for a federal agency and one of my many duties is providing assistance to the unit maintenance officer in his unending battle for the identification and control of aircraft repairs. In an attempt to do this I have been using a CoCo disk file program designed to account for all the maintenance problems existing in an eight aircraft fleet.

Throwing caution to the wind, I managed to place myself in the position of having one crashed data disk which would not read past record 14, definitely putting a crimp in my ability to help the maintenance officer.

Fortunately, in the state of North Carolina, there is a company called Superior Graphic Software and they produce a product called *Disk Doctor* which just saved me an unmentionable amount of aggravation and embarrassment.

Recalling Superior's ad in *the Rainbow*, I telephoned a very nice, albiet unknown, lady who assurred me that the *Disk Doctor* would be dispatched for an immediate house call. True to her word, the "Doctor" arrived in record time and after a one-hour ewducational process, the "Doctor" and I quickly cured the heretofore "terminal" patient.

This is to extend to the appropriate individual at Superior Graphic my appreciation for their uncommonly rapid service and an uncommonly valuable piece of software.

John Fernald
Newbury Park, CA

Editor:

An update on the problem of printing graphics from the 80C to an Epson MX80: The program available from Custom Software Engineering is the best solution to the problem. Not only does it do the job, it gives you a lot of flexibility to do more; expand the image, move it around, reverse the image and so on.

I would like to add that this program was developed in response to Custom's advertising claim, "We Want Your Suggestions!" Melvin Hefter of Custom Software Engineering kept his promise on this and other software suggestions by offering them to half price in exchange for some field testing of the program. His excitement and enthusiam for the 80C was inspiring.

Thank you, *Rainbow*, and thank you Mr. Hefter!

Bob Safir
Los Angeles

Editor:

I have a complaint to make against one of your advertisers called Snake Mountain Software. On July 28 I sent a business check for $13.95 for *the Solution* at $12.95 plus $1 postage.

The cancelled and paid check came back to me almost a month ago with my monthly statement, but I have nothing to show for it. Two letters, one polite, the other quite blunt, have done nothing to get a response from this company.

On the CompuServe Color SIG I asked others about this company and the general response was that the company is very slow and sells a product that is, at best, just O.K. In all fairness, two of the replies said that service was fast and the product good.

J. Michael Nowicki
San Jose, CA

Editor:

Your review on *101 Color Computer Programming Tips and Tricks* in the October issue of *the Rainbow* was 100 percent accurate. If you evaluate *55 Color Computer Programs for the Home, School and Office* as well as *55 More*, I am sure you will rate them the same.

I ordered these three books, as well as *Color Computer Graphics* from Arcsoft. After a three month wait for *Graphics* I can honestly say my money was ill-spent.

On the other hand, I recently bought *Programming the 6809* by Rodney Zaks and William Labiak, published by Sybex. This assembly language book is absolutely outstanding. It is well written and well worth the money.

Eugene Bouley
West Warwick, RI

Editor's Note: The *Color Computer Graphics* book to which Mr. Bouley refers is not the same as the *TRS-80 Color Computer Graphics* by Don Inman, which is published by Reston Publishing Co., not Arcsoft.

OPEN LETTER

Editor:

This message is really addressed to your subscribers rather than to the editor.

With the rapid approaching advent of the Christmas season, it is anticipated that there will be a record number of Color Computers purchased. This implies a big surge in the ranks of the beginners.

I would urge all of you subscribers to encourage the people whom you helped convince that the 80C is the finest of the personal computers available (and the one to purchase), to subscribe immediately to *the Rainbow*. They will be glad they did and your back issues will be safe and sound.

The Rainbow is a good, general-purpose magazine that is valuable to the newcomer to computing; valuable to the journeyman programmer and not to be overlooked or sneezed at by the "elite." End of message.

Joseph Kolar
Inverness, FL

CONVERTING EASIER

Editor:

I have read and re-read articles by Mr. L. C. Falk about *Converting Programs From Other Computers To Your 80C* in the August issue of *Rainbow*.

My feeling is that the article was written in such a way that it might make afraid many of your subscribers to try converting other programs to 80C.

Let me say first of all that contrary to what was said, all those who possessed an 80C with Extended Basic have up to now a computer with the most amplified language than all the others that came to market

before it.

I am referring to programs written in Basic of course, even if they include peek and poke in them. I know by experience, because I have mastered Basic programming by converting or adapting many programs from Apple II, Pet Commodore, Model I, II and III to 80C with relative facility.

I take this opportunity to ask *Rainbow* to add in the future all the necessary explainations about the program (to allow for convertions). It would take more room but it could the games that are regularly published in every issue.

Alain Dussault
Laval, P.Q.

Editor's Note: We agree that our listings could be much more detailed to allow for conversions. As M. Dussault points out, that would take up a great deal more space—and something would have to go. What he suggests should go are the games—yet we expect Mr. Finkel (see letter above) would be upset by that. Further, we see *the Rainbow* as a magazine for the CoCo. While we have no objection to owners of other computers purchasing it and converting our programs, we feel it would be unfair to *Rainbow* readers to stint on their programs so others could convert.

CLUBS

Editor:

I would much appreciate it if you would advertise the existance of our club to your readers in Canada. I am the secretary of the Durham 80C Computer Club. I can be reached at 782 Kenora Ave., Oshawa, Ont., Canada L1J 1K6.

Brian Smith
Oshawa, Ont.

Editor:

I want to announce the formation of a new club for the 80C. The Westchester area Color Computer Club does not have a formal meeting place yet, but you can get information by writing me at 6 Center Street, Irvington, NY 10533 or call (914) 591-8170. It would be better to write because there is a chance I will not be in when you call.

Second, in response to Clarence McCoy's letter referring to keyboards: There is a way to interface a Model I keyboard to the 80C. The details were published in an old *80 Micro*.

Greg Peerst
Irvington, NY

Editor:

Please announce the existance of our Color Computer Club in the West Mifflin area.

The club meets every second Sunday from noon to 4 p.m. at the Community College of Allegheny County on the South Campus behind the Century III Mall on Route 885 in the Pittsburgh South area.

More information can be had by calling me at (412) 466-6437 or writing to 529 Mifflin Street, Duquesne, PA 15110.

Alan Jakub
Duquesne, PA

Editor's Notes...

PRINT #-2,

I went to the mailbox in front of the house the other day and reached in to see what there was. One item caught my eye because it was so big.

It turned out to be my own copy of the October *Rainbow*. I was a bit surprised, because there were a couple of other magazines in the mail box (we have one of those rural-style boxes that you can cram a lot into), some advertising materials and, even, a Christmas catalog along with the bills.

I suppose that nothing brought home to me the length of the road we have traveled in the first 16 months of publication more than that simple, everyday act of getting the mail at home. I've seen *the Rainbow* loaded on skids (big skids) at the printer's and in huge baskets (they call them tubs) at the Post Office. And, I've wondered what would have happened if we had had to transport it to the Post Office ourselves like we used to do—because we have more than a ton of magazines going out every month—and that is just to U.S. subscribers.

But the simple act of reaching in my own mail box at home and seeing this thick magazine really made an impression. And, while this month's *Rainbow* is, at this writing, planned to be even larger, 132 pages is a whole bunch of paper.

Size, however, is not the only important thing. I decided to try to guesstimate what was inside, and ended up with the impression that last month's issue had 81K worth of programs and 45,000 or so words of editorial copy in it.

I hope you are still reading this, because we have some interesting and important news. First of all, if all goes well, you will see a significant change in what we hope is your favorite computer magazine in December. And, as 1982 evolves into 1983, expect to see some other changes, too. These will be more in the area of layout and makeup—hopefully to make it easier for you to read and find things inside. As *the Rainbow* continues to grow (with your support), we will be looking at departmentalizing the magazine more.

The other piece of news is that we will be increasing our subscription rate, effective January 1. The new rate will be $22 per year for United States subscribers; $29 per year for Canadian and Mexican subscribers; $39 per year for overseas surface rate and $57 per year for overseas air mail subscriptions. The cover price remains $2.95. All rates are in United States currency.

Much of this rate increase is reflected by additional mailing costs. Even at third class mail, it is expensive to send out *the Rainbow* each month. Last month's postage bill was more than the first eight months combined.

But the cloud has a silver lining. Every present subscriber is entitled to renew his or her subscription—actually extend it—for up to a year at the present rate. This is provided your renewal is postmarked no later than December 31, 1982. We very much appreciate your support and want to show that appreciation by offering those of you who have helped us grow the opportunity to renew now at a lower rate than will be available when your current subscription term ends.

Those rates are $16 per year in the U.S., $22 in Canada and Mexico, $31 by surface rate and $49 by air, all in U.S. currency. And the renewal is for one year *only*. You may, if you wish, add on a second year at the *new* rate. It certainly looks like, with your support, we are here to stay; and offering a renewal early at a reduced rate is our way of trying to say "thank you."

I hope you will join me in welcoming Courtney Noe as our associate editor. Courtney has experience as an editor and writer on a number of magazines and brings a wealth of experience to *the Rainbow*.

We have a couple of new things in the works for the new year. Both of them are the result of preliminary returns from our Reader Survey. First off, we plan a series of Hardware columns and, while we cannot tell you just yet who the author will be, suffice it to say he's someone whose name many of you will recognize.

We also plan a "purely beginners" column. This is a from the ground up series, but I think even those of you who have some experience with CoCo will find some useful tidbits in this new feature.

By the way, we are in the process of expanding our outside reviewing staff, so if you are interested, please let us know. However, be forewarned that our insistance on *the Rainbow* meeting its deadline every month requires that we ask for fast turn-around on reviews. Contact us if you are interested. And, let us know what the areas are in which you are most interested.

Boy, the magazine business is a funny one. You will find a 3D-like game inside this issue. We thought it would be a "first" and an "exclusive." But, at the same time, the people at *80 Micro* were working on much the same thing for their big

Continued on Page 142



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Game...

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Now: Get A 3-D View of Space

By Fred Scerbo

Most arcaders are looking for rapid-fire action and colorful, hi-res graphics. Add to this the latest revival of the 3-D craze and you have "Startrench Warfare" 1.0 from Illustrated Memory Banks.

The following program is offered as an exclusive to readers of *the Rainbow*. You will find that it is a very short program (only 27 lines) which will just fit in 16K. While you don't need a pair of 3-D glasses to thoroughly enjoy this game, you will get an added perspective of depth by wearing standard 3-D glasses while running it.

3-D, for that matter, seems to be a variation of the CoCo's excellent graphics that opens a whole new area to explore. This article and program are but one of two which will appear this month on the same subject. If 3-D is an area of interest to you, you might wish to look up the other program available in a magazine. It will appear in *80 Micro's* special third anniversary issue. And, if you don't have a pair of 3-D glasses, *80 Micro* has a pair for you—bound inside the magazine.

Both *the Rainbow* and *80 Micro* offer pretty much the same thing—a 3-D-like program. For many persons, adding the glasses will give the appearance of depth—but will not give you true "jump-out-at-'ya" 3-D. We believe such an effect is possible, and would encourage readers to share thoughts and programs which do this.

The quality of the 3-D effect will—we have found—depend on your own eyes' registration of color values as well as the ability of your monitor or TV set to produce accurate colors.

Now, a few words about *Startrench Warfare:*

The program does not need the POKE65495,0 speed-up to run. You may wish to add this command when running the program for some added punch. But, make sure to POKE65494,0 before you CSAVE it (Use CSAVE"ST*TRNCH"). You may make two copies for your own use only. The program uses PCOPY and hi-res page flipping to add to the sense of movement. You will also get four colors in PMODE4,1. This is where the 3-D feel will come in. Since 3-D glasses use red and blue filters to cancel opposing images for the right and left eyes, use of the glasses with this program will cause an optical shift which will give a "3-D like" effect. (This will not give a real sense of depth but an illusion which does cause enough of an optical shift to appear much more dramatic than you can get without the glasses on.) You may wish to experiment by trying to draw opposing objects in blue and red to give your programs a 3-D look. Due to the intensity of the images produced by the 80C, it is difficult to get total right-left optical image cancellation. Still, you can try.

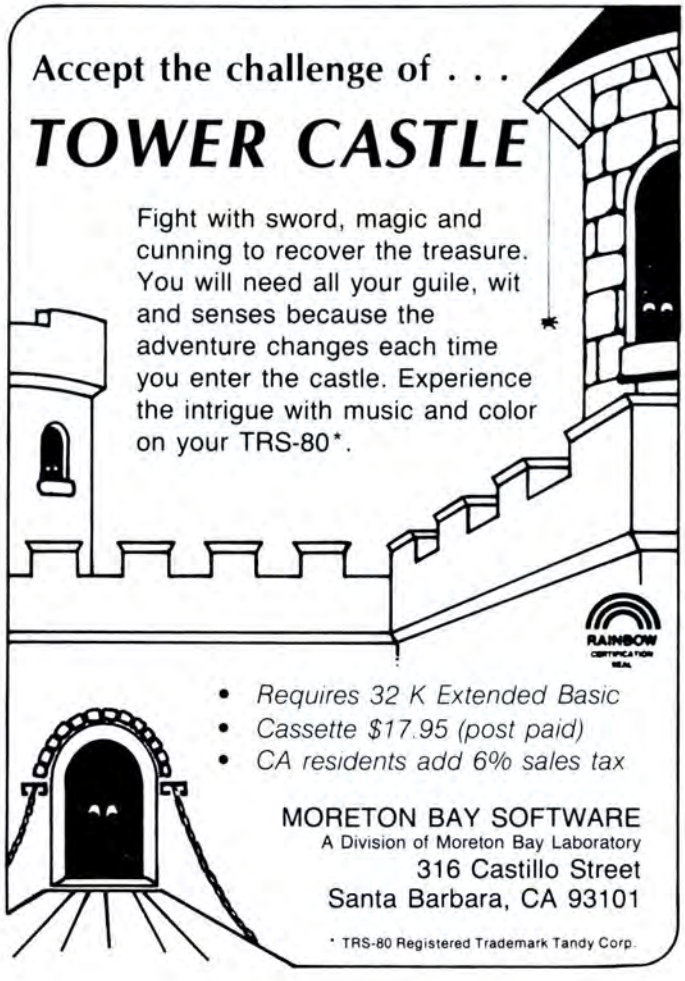
Also, you may wish to try using glasses on other 80C games. *Alpine Aliens*, which we printed several months ago, works fine, as will *Kosmic Kamikaze* and *Creatavader*. Radio Shack's *Polaris* ROM cart also gives some nice effects with the glasses. You can open up a whole new world with your color games by using the glasses.

The object of the game is simple. (Yes, this is another "shoot-em up." We're working on others.) You pilot your ship down the moving trench of the space station. You must blast the alien craft which appear ahead of you. Press the fire button on your right joystick to fire. The craft will appear in nine possible positions. (3 up and down, 3 left and right.) Aiming is not too difficult, but you have no crosshairs. The gauge at the top of the screen shows how much energy you have left. At the end of the game, you will see how many of the attackers you have destroyed. (Top score so far is 45 aliens!)

Very soon, 1MB will release a 32K version of this game which will do much, much more. Until that time you may enjoy this game as part of our continuing effort to keep providing exciting software for your 80C.

The Listing:

```
1 CLS0:PCLEAR8:CLEAR100
2 PRINT@135,"STARTRENCH WARFARE"
;:PRINT@207,"BY";:PRINT@265,"FRE
D B. SCERBO";:PRINT@324,"ILLUSTR
ATED MEMORY BANKS";:PRINT@391,"C
OPYRIGHT (C) 1982";
3 K=255:PMODE4,1:PCLS0:SCREEN0,1
:S$="BL6U7R2D7NL2U3R2FR2ER2D3R2U
7L2D3L2HL2GL2"
4 LINE(0,0)-(256,40),PSET,BF:LIN
E(0,16)-(256,30),PRESET,BF:FORI=
0TO13STEP13:FORY=8TO25STEP8:LIN
E(Y,16+I)-(Y,17+I),PSET:NEXTY:NE
XTI:FORI=0TO256STEP2:LINE(I,120)
-(I,192),PSET:NEXT:FORI=1TO253ST
EP2:LINE(I,20)-(I,26),PSET:NEXTI
5 FORI=1TO70:PSET(RND(256),RND(7
8)+40):NEXTI:LINE(96,120)-(156,1
40),PRESET,BF:LINE(96,140)-(20,1
92),PRESET:LINE(156,140)-(236,19
2),PRESET
6 LINE(96,120)-(0,152),PRESET:LI
```

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```
NE(156,120)-(256,152),PRESET:PMO
DE3,1:SCREEN0,1:PAINT(126,168),2
,1:PMODE4,5:PCLS0:SCREEN0,1:FORY
=1TO4:PCOPY Y TO Y+4:NEXTY
7 PMODE4,1:SCREEN0,1:LINE(0,132)
-(56,132),PRESET:LINE-(57,166),P
RESET,BF::LINE-(196,166),PRESET:
LINE-(197,132),PRESET,BF:LINE-(2
56,132),PRESET
8 LINE(0,123)-(86,123),PRESET:LI
NE-(87,146),PRESET,BF::LINE-(166
,146),PRESET:LINE-(167,123),PRES
ET,BF:LINE-(256,123),PRESET
9 LINE(0,144)-(22,144),PRESET:LI
NE-(23,188),PRESET,BF:LINE-(230,
188),PRESET:LINE-(231,144),PRESE
T,BF:LINE-(256,144),PRESET
10 PMODE4,5:SCREEN0,1:LINE(0,128
)-(76,128),PRESET:LINE-(77,152),
PRESET,BF:LINE-(174,152),PRESET:
LINE-(175,128),PRESET,BF:LINE-(2
56,128),PRESET
11 LINE(0,138)-(40,138),PRESET:L
INE-(41,178),PRESET,BF:LINE-(216
,178),PRESET:LINE-(217,138),PRES
ET,BF:LINE-(256,138),PRESET
12 L=1:G(1)=30:G(2)=127:G(3)=226
:H(1)=50:H(2)=75:H(3)=100:G$(1)=
"30":G$(2)="127":G$(3)="226":H$(
1)="50":H$(2)="75":H$(3)="100"
13 PMODE4,L:SCREEN1,1:E=RND(3):F
=RND(3)
14 DRAW"BM"+G$(E)+","+H$(F)+"C1"
+S$
15 IFPEEK(339)=255THEN23
16 X=JOYSTK(0):Y=JOYSTK(1):IFX<2
0THENP=1ELSEIFX>40THENP=3ELSEP=2
17 IFY<20THENQ=1ELSEIFY>40THENQ=
3ELSEQ=2
18 LINE(0,118)-(G(P),H(Q)),PSET:
LINE-(0,118),PRESET:LINE(255,118
)-(G(P),H(Q)),PSET::LINE-(255,11
8),PRESET:PLAY"L255GC"
19 K=K-1:IFK<=3THEN26
20 LINE(K+3,20)-(K,26),PRESET,BF
21 IFP=E AND Q=F THEN22ELSE24
22 FORW=1TO2:PMODE3,L:SCREEN1,1:
PLAY"O1ECO3":PMODE4,L:SCREEN1,1:
NEXTW:TS=TS+1:GOTO24
23 FORW=1TO150:NEXTW
24 IFL=1THENL=5ELSEL=1
25 DRAW"BM"+G$(E)+","+H$(F)+"C0"
+S$:GOTO13
26 CLS0:PRINT@128,"  YOU ZAPPED"
;TS;"ALIEN FIGHTERS.":PRINT@192,
"  PRESS SPACEBAR FOR NEW GAME."
27 IFINKEY$=CHR$(32)THENRUNELSE2
7
```


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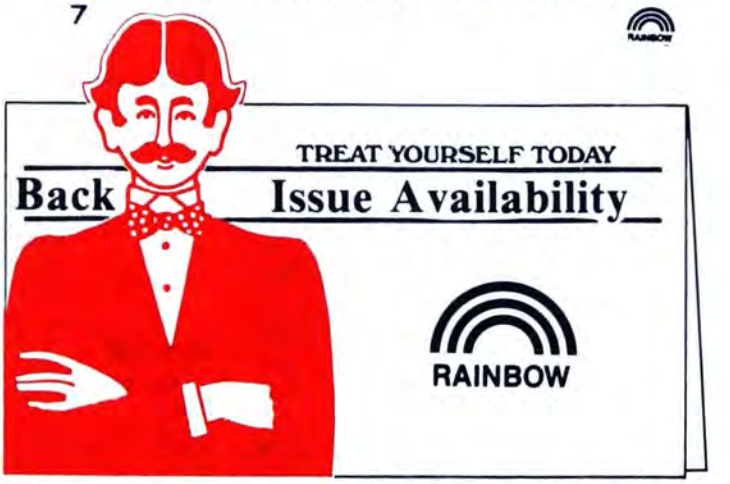
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USING GRAPHICS

For More Graphics Info... Turn the Page!

By Don Inman
***Rainbow* Contributing Editor**

This is the second article of a series on the graphic capabilities of the TRS-80 Color Computer using Extended Color Basic. Some of the material in this article is taken from TRS-80 Color Computer Graphics, published by *Reston Publishing Company, Inc.*

I know from past experience that some of you will think we are moving too fast in this series, and some of you will think that we are moving too slow. Let me know if you have any particular problems, questions, or suggestions concerning this series. Send correspondence to: *Don Inman, Dymax, P.O. Box 310, Menlo Park, CA 94025.*

In the October issue of *The Rainbow* we discussed selecting the mode, clearning the screen, and turning on the screen. A timed comparison was made in drawing rectangles by the PSET, LINE, and DRAW statements.

We will discuss turning pages to achieve animation in this issue. This technique is particularly useful in the lowest mode of high resolution graphics where one page of memory will fill the video display. Later articles in the series will deal with methods more suitable to high-resolution modes.

Memory Used to Fill the Screen

As we pointed out in the last issue, the amount of memory used to fill the screen depends upon the PMODE selected. This fact is very important. It determines the number of unique complete-screen displays that can be stored in memory. In general, higher resolution and more colors require more memory than lower resolution and fewer colors.

TABLE 1 Screen Pages

PMODE	Pages Used Per Screen	Memory Per Screen	Number Of Full-Screen Displays Stored
4	4	6K	2
3	4	6K	2
2	2	3K	4
1	2	3K	4
0	1	1.5K	8

As you can see from Table 1, 12K of memory is used to make full use of paging the maximum number of full-screen displays.

There are several techniques that can be used to animate a display by using several pages of graphics. The first method to be discussed is that of putting different full-screen displays on each page. Then each complete screen is displayed, one screenfull at a time.

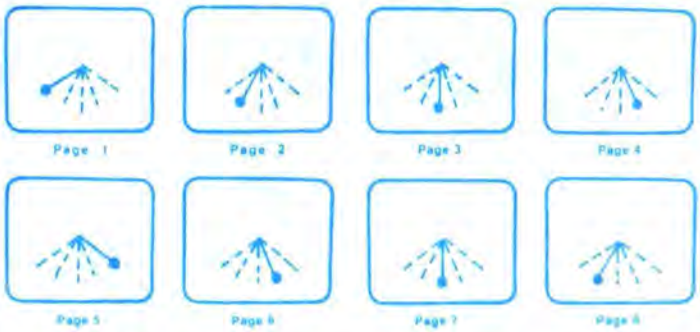
Turning Pages in PMODE 0

PMODE 0 offers the most straightforward method of selecting which page is displayed. It also offers the greatest number of distinct pages. However, only two colors can be used at one time, and the graphic elements are large, giving coarse resolution. Because of the large number of distinct pages, it is ideal for using this first method of paging.

Suppose that you want to simulate the movement of a pendulum swinging back and forth. The positions displayed will occur in the order shown in Figure 1. You can see that there are five distinct positions which could be simulated by displaying separate graphic pages in the sequence:

1,2,3,4,5,6,7,8,1,2,3,4,5,6,7,8,1,2,3,....etc.

FIGURE 1 Display Sequences



A FOR-NEXT loop would provide an ideal way to simulate one complete cycle of the pendulum. If the loop is repeated, the pendulum will appear to swing back and forth continuously. A tick-tock sound could be added along with a time delay for adjusting the speed of the pendulum. Here is a loop that could be used, assuming the displays have been previously drawn on the appropriate pages.

```
700 ' SWINGER
710 FOR P = 1 TO I
720 PMODE 0,P  <-- page changer
730 SCREEN 1,1  <-- turn on display P
740 IF P = 3 THEN PLAY"05;T150;C  <-- tick on page 3
750 IF P = 7 THEN PLAY"04;C  <-- tock on page 7
760 FOR W = 1 TO 50: NEXT W  <-- speed control
770 NEXT P
780 GOTO 710
```

Drawing the Pendulum

As you can see from Figure 1, there are only five distinct positions for the pendulum. This gives you an opportunity to use the PCOPY statement for the three duplicate positions. As an example, notice that positions 2 and 8 are the same. Therefore, the drawing and copying statements for those two pages might be:

```
300 ' DRAW PAGE 2, COPY TO 8
310 PMODE, 0,2  <-- draw it on page 2
320 CIRCLE(98,124),6  <-- center at 98,124;radius 6
330 LINE(128,96)-(100,123),PSET  <-- draw arm
340 PAINT (98,124),5,5  <-- paint it buff
350 PCOPY 2 TO 8  <-- copy it to page 8
```

Notice that the SCREEN statement is not used for drawing. All eight drawings are made before turning on the screen. They are displayed in order (1 through 8) when the FOR-NEXT loop, described previously, is executed.

The Completed Pendumum Simulation

We are now ready to look at the complete program. The two previous operations form the heart of the program. One other point should be mentioned here. You have no doubt encountered problems when including a PCLEAR statement in your programs. The programs in this article use a technique described by several *Rainbow* readers. We immediately jump outside the program to PCLEAR 8 pages and then return (see lines 110 and 1000).

```
SWINGING PENDULUM
100 ' CLEAR PAGES
110 GOTO 1000  <-- PCLEAR 8 pages of screen
120 FOR P = 1 TO 8   } memory outside the program
130 PMODE 0,P        } clean each page
140 PCLS             }
150 NEXT P           }
```

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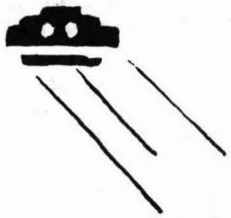
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```
200 'DRAW ON PAGE 1
210 PMODE 0,1
220 CIRCLE(92,110),6
230 LINE(128,96)-(96,108),PSET
240 PAINT(92,110),5,5

300 ' DRAW ON PAGE 2, COPY TO 8
310 PMODE 0,2
320 CIRCLE(98,124),6
330 LINE(128,96)-(100,12),PSET
340 PAINT(98-124),5,5
350 PCOPY 2 to 8

400 ' DRAW ON PAGE 3, COPY TO 7
410 PMODE 0,3
420 CIRCLE(128,130),6
430 LINE(128,96)-(128,128,PSET
440 PAINT(128,130),5,5
450 PCOPY 3 TO 7

500 ' DRAW ON PAGE 4, COPY to 6
510 PMODE 0,4
520 CIRCLE(158,123),6
530 LINE(128,96)-(156,122),PSET
540 PAINT(158,124),5,5
550 PCOPY 4 to 6

600 ' DRAW ON PAGE 5
610 PMODE 0,5
620 CIRCLE(164,110),6
630 LINE(128,96)-162,108),PSET
640 PAINT(164,110),5,5

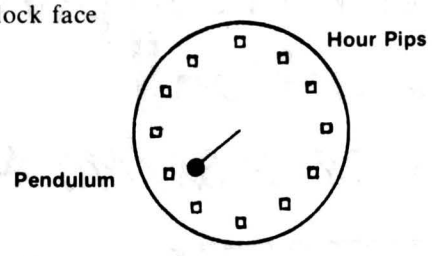
700 ' SWINGER
710 FOR P = 1 TO 8
720 PMODE 0,P
730 SCREEN 1,1 ← buff/ black display
740 IF P = 3 THEN PLAY"05:T150:C" ← tick
750 IF P = 7 THEN PLAY"04:C" ← tock
760 FOR W = 1 to 50: NEXT W
770 NEXT P
780 GOTO 710 ← keep swinging

1000 PCLEAR 8: GOTO 126
```

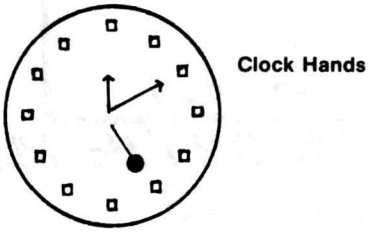
Suggestions for Additions

If you want to make the basic pendulum program into a real time clock, there are several enhancements that you could add.

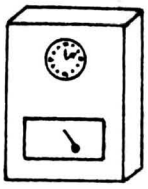
1. a clock face



2. hour and minute hands



3. the TIMER function to keep real time
4. chimes on the hour
5. an enclosure



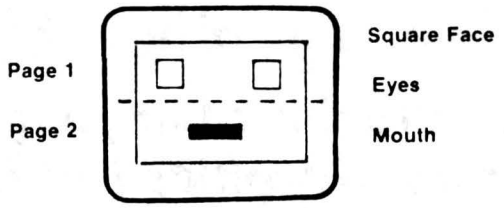
6. a pop out cuckoo

etc. ....I'm sure that you can think of other things to try.

Changing Pages in Other Modes

The same technique can be used in other graphic modes. However, you must keep in mind the number of graphic pages necessary to fill the screen. We'll demonstrate with PMODE 1 which uses four colors and two pages for each screen display. We'll use our Robbie, the robot figure from the Chapter 5 Test of TRS-80 Color Computer Graphics, but we give it a few enhancements.

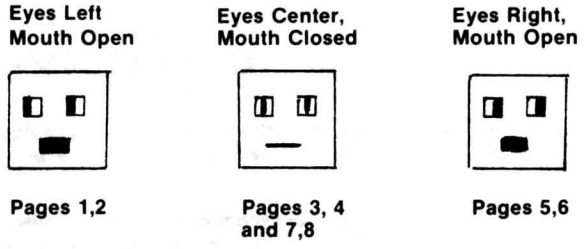
Robbie's basic features will be used on all displays. They are:



The eyes will be blue and will change positions as we page. The mouth will be red and will open and close as we change pages. Since each screen uses two pages of graphic memory, we will step two pages at a time in the FOR-NEXT loop that turns the pages.

```
600 ' DISPLAY PAGES
610 FOR P = 1 TO 8 STEP 2        display pages in pairs
620 PMODE 1,P
630 SCREEN 1,0        green, yellow, blue and red
640 FOR W = 2 TO 50: NEXT W
650 NEXT P
660 GOTO 610
```

The drawings made will look something like this:



The basic drawing is made up of rectangles using the BOX option with the LINE statement.

Example:

```
LINE(63,32)-(191,159),PSET,B
```

upper left lower right set points draw box

The basic figure, which is drawn on pages 1 and 2, will be copied to other pages.

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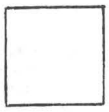
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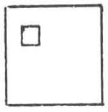
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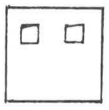
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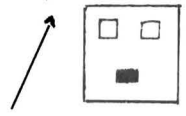
LINE(89,51)-(115,77),PSET,B



(LINE(139,51)-(165,77),PSET,B



LINE(102,122)-(152,128),PSET,BF



fill rectangle with color

FOR P = 3 TO 6 STEP2 ← pages 7,8 copied later
PCOPY 1 to P
PCOPY 2 to P+1
NEXT P

The eyes will be placed in the desired position, and an addition will be made to the mouth on pages 2 and 6 as shown in the completed program which follows.

Additions to the Program

If you have some kind of speech synthesizer, you could substitute some speech for the FOR-NEXT loop at line 640. Another method would be to pre-record some speech on your tape recorder and play it back at line 640 using the MOTOR ON/OFF feature of Extended Color Basic. Spice it up any way you like and try other shapes in place of Robbie.

The next article in the series will discuss higher resolution graphic modes. We will show how to draw on one page during the time that a second page is being displayed.

Listing 1

```
100 'CLEAR PAGES
110 GOTO 1000
120 FOR P = 1 TO 8
130 PMODE 0,P
140 PCLS
150 NEXT P
200 'DRAW ON PAGE 1
210 PMODE 0,1
220 CIRCLE(92,110),6
230 LINE(128,96)-(96,108),PSET
240 PAINT(92,110),5,5
300 'DRAW PAGE 2, COPY TO 8
310 PMODE 0,2
320 CIRCLE(98,124),6
330 LINE(128,96)-(100,123),PSET
```

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```
340 PAINT(98,124),5,5
350 PCOPY 2 TO 8
400 'DRAW PAGE 3, COPY TO 7
410 PMODE 0,3
420 CIRCLE(128,130),6
430 LINE(128,96)-(128,128),PSET
440 PAINT(128,130),5,5
450 PCOPY 3 TO 7
500 'DRAW PAGE 4, COPY TO 6
510 PMODE 0,4
520 CIRCLE(158,124),6
530 LINE(128,96)-(156,122),PSET
540 PAINT(158,124),5,5
550 PCOPY 4 TO 6
600 'DRAW PAGE 5
610 PMODE 0,5
620 CIRCLE(164,110),6
630 LINE(128,96)-(162,108),PSET
640 PAINT(164,110),5,5
700 'SWINGER
710 FOR P=1 TO 8
720 PMODE 0,P
730 SCREEN 1,1
740 IF P=3 THEN PLAY"O5;T150;C"
750 IF P=7 THEN PLAY"O4;C"
760 FOR W=1 TO 50:NEXT W
770 NEXT P
780 GOTO 710
1000 PCLEAR 8: GOTO 120
```

Listing 2

```
100 'CLEAR PAGES
110 GOTO 1000
120 FOR P=1 TO 8 STEP 2
130 PMODE 1,P
140 PCLS
150 NEXT P
200 'DRAW BASIC FIGURE
210 PMODE 1,1
220 LINE(63,32)-(191,159),PSET,B
230 LINE(89,51)-(115,77),PSET,B
240 LINE(139,51)-(165,77),PSET,B
250 LINE(102,122)-(152,128),PSET
,BF
300 ' COPY
310 FOR P=3 TO 6 STEP 2
320 PCOPY 1 TO P
330 PCOPY 2 TO P+1
340 NEXT P
400 ' ADD TO PAGE 5
410 COLOR 3,1
420 LINE(89,51)-(98,77),PSET,BF
425 LINE(139,51)-(148,77),PSET,B
F
430 COLOR 4,1
440 LINE(102,118)-(152,122),PSET
,BF
450 PMODE 1,3
460 COLOR 3,1
470 LINE(98,51)-(107,77),PSET,BF
475 LINE(148,51)-(157,77),PSET,B
F
480 PCOPY 3 TO 7
490 PCOPY 4 TO 8
500 PMODE 1,5
505 COLOR 3,1
510 LINE(107,51)-(115,77),PSET,B
F
515 LINE(157,51)-(165,77),PSET,B
F
520 COLOR 4,1
```



```
530 LINE(102,118)-(152,122),PSET
,BF
600 'DISPLAY
610 FOR P=1 TO 8 STEP2
620 PMODE 1,P
630 SCREEN 1,0
640 FOR W= 1 TO 300:NEXT W
650 NEXT P
660 GOTO 610
1000 PCLEAR 8:GOTO 120
```


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Science Education Notes A=X

This 'Initial' Experience Can be Child's Play!

16K ECB

By Steve Blyn
Rainbow Contributing Editor

(Mr. Blyn, who teaches both exceptional and gifted children, holds two Master's degrees in the field of education and has won an award for the design of a computer program to aid handicapped children. He and his wife, Cheryl, own Computer Island.)

This month, we are presenting a program that can easily be explained to, and then programmed and altered by, most children. Use the ideas illustrated here as a springboard for some introductory programming by children.

Simple programming should be begun as early as possible. The chances that any youngster will encounter computers on his/her future job in almost any field are overwhelming. The earlier kids are exposed to computers and learn something about them, the less reluctance they'll have later on to deal with them.

We must try to create learning programs that personally appeal to youngsters. One very personal item in the heart of a child is his name. This program will be about his initials. It could also be done for any initials of the child's choice, but his own monogram would probably mean the most to him. The possibilities on a two letter monogram are (26x26) and on a three initial monogram they are enormous (26x26x26). We will use my initials (S B) as our working example.

Let's start with a small piece of graph paper. Now design a monogram in the boxes. Decide how many squares high and wide each letter should be before you start. Five by five is a good size to work with. Now fill in the appropriate boxes with letters, numbers or symbols to design your monogram.

Preplanning this project is excellent practice for a "junior" programmer. He gets to plan out a relatively easy job, and can see his results shortly. It is important for youngsters to get feedback on their work as soon as possible. If a youngster does a less-than-perfect job of planning, he will see his imperfect results on the screen or printer and be able to immediately go back and make the necessary corrections. As one advances in programming, it is essential to have developed good skills of preplanning, and the habit of checking work often.

If you have a printer, turn it on and set it ON-LINE before running this program. Lines 50-80 let you decide whether to include using a printer. If you choose to use a printer, the monogram will go first to the printer and then to the screen. If you want to check your work on the screen first, answer 'N' for the question. Line 60 is included because many times kids (and others) will deliberately press letters or keys other than the choices given just to see what might happen.

Lines 250 to 330 print the monogram on the printer and then return to print it on the screen. Lines 100 and 230 let the monogram flash from the left side of the screen to the center. The printing of blanks (" ") clears the line before each succeeding movement and helps create the appearance of motion. Line 240 holds the monogram in place for inspection until the BREAK key is pressed to end the program.

This monogram utilizes the individual letters within the larger letter. Any modification the youngster decides to use is certainly to be encouraged. Borders of asterisks, dashes, letters, screen graphics, or printer graphics all add to the enjoyment of this kind of exercise. So, have fun. Grab a kid, yours or someone else's, explain this program, and watch his planning grow and his imagination go!

The Listing:

```
10 REM"MONOGRAM"
20 REM"STEVE BLYN"
30 REM"COMPUTER ISLAND"
40 CLS
50 LINE INPUT"DO YOU HAVE A PRIN
TER?(Y/N)";P$
60 IF LEFT$(P$,1)<>"Y" AND LEFT$
(P$,1)<>"N" THEN 50
70 IF LEFT$(P$,1)="Y" THEN GOSUB
 250
80 IF LEFT$(P$,1)="N" THEN 90
90 CLS
100 FOR B= 1 TO 10:PRINT@160," "
:PRINT@160+B," SSSS   BBBB ";:SO
UND 150,1:NEXTB
110 FOR B= 1 TO 10:PRINT@192," "
:PRINT@192+B,"S      B   B";:SO
UND200,1:NEXT B
120 FOR B= 1 TO 10:PRINT@224," "
:PRINT@224+B,"  S    BBBB ";:SO
UND100,1:NEXTB
130 FOR B= 1 TO 10:PRINT@256," "
:PRINT@256+B,"    S   B   B";:SO
UND225,1:NEXT B
140 FOR B= 1 TO 10:PRINT@288," "
:PRINT@288+B,"SSSS    BBBB ";:SO
UND125,1:NEXT B
150 J=458
160 K=10
170 FOR T= 1 TO 3
180 PRINT@J," ":PRINT@J-32,"----
--------";
190 PRINT@K," ":PRINT@K+32,"----
--------";
200 SOUND 200,2
210 J=J-32
220 K=K+32
230 NEXT T
240 GOTO 240
250 PRINT#-2,TAB(10)"----------
--"
260 PRINT#-2,TAB(10)" SSSS   BBB
B"
270 PRINT#-2,TAB(10)"S       B
 B"
280 PRINT#-2,TAB(10)"  S     BBB
B"
290 PRINT#-2,TAB(10)"    S   B
 B"
300 PRINT#-2,TAB(10)"SSSS    BBB
B"
310 PRINT#-2,TAB(10)"----------
--"
320 FOR T= 1 TO 500: NEXT T
330 RETURN
```

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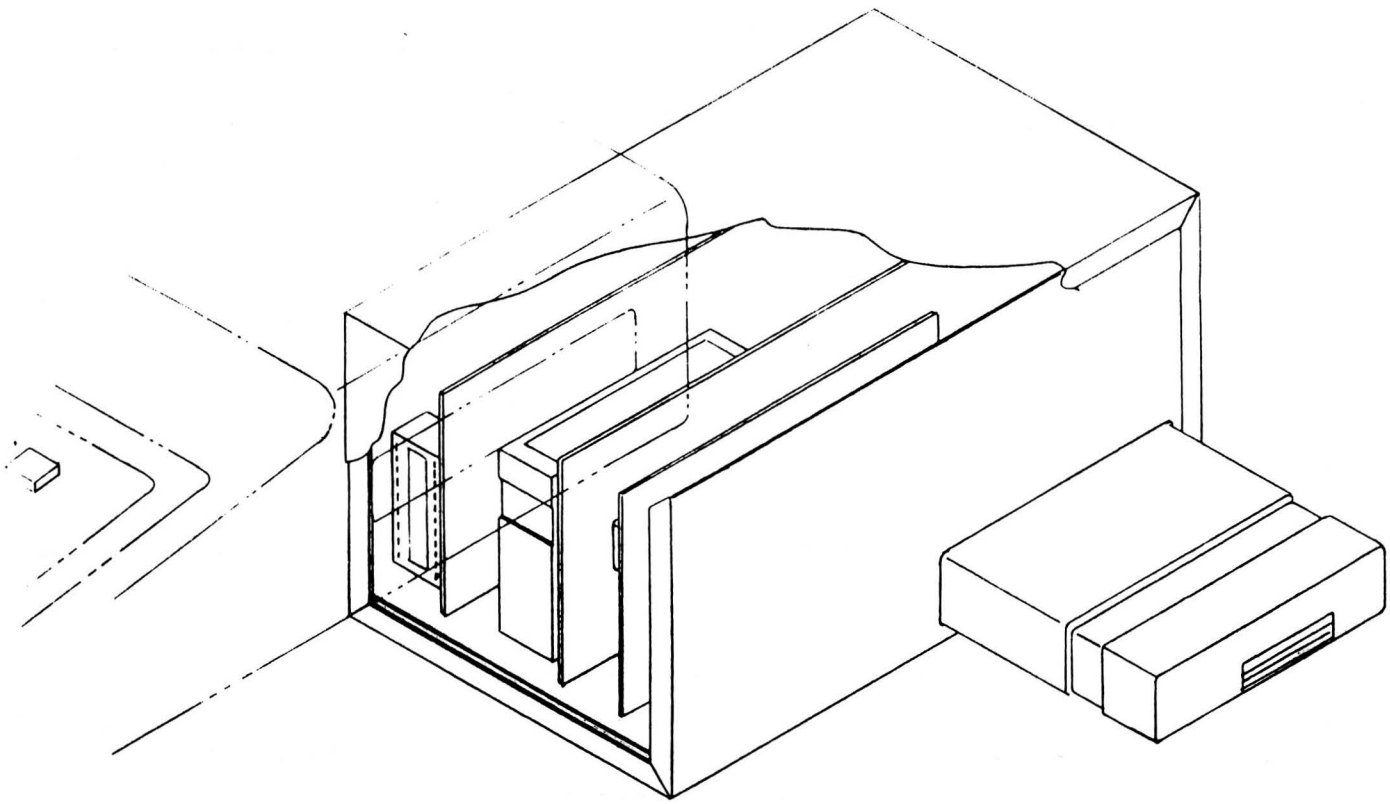
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Graphics...

Some Beautiful Patterns From "Down Under"

16K ECB

by R.T. and D. Delbourgo
Hobart, Tasmania, Australia

Most of you will have noticed the beautiful fringes which are produced when two net curtains are placed against one another—a slight movement in one of the curtains causes an appreciable movement of the fringe system. These interference fringes are called after Moire and they have important scientific applications in registering and measuring small relative movements.

The high resolution graphics on your 80C are well suited to exhibit Moire fringes and we have listed below four sample programs which demonstrate the nature and motion of the resulting fringes. As far as we know, the idea has not been mentioned before in *the Rainbow* or in any other computer magazine, and we can foresee many striking applications of the concept in the hands of the software experts. Being complete novices in computing (having had an 80C only three months), we must apologize for the primitive nature of the programs. Experts may enjoy streamlining and speeding them up, particularly listing four, and generally exercising their skills on them. The only bit of spice we have added is a randomization of the colour schemes every time the programs are rerun.

It is unnecessary for you to type all the listings separately—just alter the heading lines, the subroutine lines and lines 13, 17, 21.

Obviously, an infinite number of variations on Moire fringes is possible. You might like to modify the spacing of the individual families of intersecting curves (but be careful not to make the spacing exceed four times the actual line width or you will run out of graphic pages, and be sure you have the same spacing on each graphic page), or you might prefer to obtain high resolution (we have stuck to the 4 color Pmode 1). The more enterprising among you may devise new families of intersecting curves (waves, spirals, conic sections, etc.), and for luck you might venture to add another intersecting family of curves.

Have fun, the possiblilities are endless!

Listing 1

```
1 CLS(8)
2 PRINT@233,"MOIRE FRINGES";
3 PRINT@264,"LINES WITH LINES";
4 PRINT@302,"BY";
5 PRINT@361,"THE DELBOURGOS";
6 FORS=250TO50STEP-5:SOUNDS,1
7 NEXT
8 PCLEAR8
9 C1=RND(3)+1:C2=RND(3)+1
10 SC=RND(2)-1
11 PMODE1,1:COLORC1,1:PCLS
12 SCREEN1,SC
13 FORH=0TO255STEP6:GOSUB28:NEXT
14 COLORC2,1:GOSUB29
15 PMODE1,3:COLORC1,1:PCLS
16 SCREEN1,SC
17 FORH=2TO255STEP6:GOSUB28:NEXT
18 COLORC2,1:GOSUB29
19 PMODE1,5:COLORC1,1:PCLS
20 SCREEN1,SC
21 FORH=4TO255STEP6:GOSUB28:NEXT
22 COLORC2,1:GOSUB29
23 FORP=1TO5STEP2:PMODE1,P
24 SCREEN1,SC
25 FORT=1TO30:NEXTT
26 NEXTP
27 GOTO23
28 LINE(H,0)-(H,191),PSET:RETURN
29 FORR=0TO231STEP12
30 LINE(R,0)-(R+24,191),PSET
31 NEXT:RETURN
```

Listing 2

```
1 CLS(4)
2 PRINT@233,"MOIRE FRINGES";
3 PRINT@264,"LINES / ELLIPSES";
4 PRINT@302,"BY";
5 PRINT@361,"THE DELBOURGOS";
6 FORS=50TO250STEP5:SOUNDS,1
7 NEXT
8 PCLEAR8
9 C1=RND(3)+1:C2=RND(3)+1
10 SC=RND(2)-1
11 PMODE1,1:COLORC1,1:PCLS
12 SCREEN1,SC
13 FORV=0TO191STEP3:GOSUB28:NEXT
14 COLORC2,1:GOSUB29
15 PMODE1,3:COLORC1,1:PCLS
16 SCREEN1,SC
17 FORV=1TO191STEP3:GOSUB28:NEXT
18 COLORC2,1:GOSUB29
```


New Color Computer Products

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```
19 PMODE1,5:COLORC1,1:PCLS
20 SCREEN1,SC
21 FORV=2TO191STEP3:GOSUB28:NEXT
22 COLORC2,1:GOSUB29
23 FORP=1TO5STEP2:PMODE1,P
24 SCREEN1,SC
25 FORT=1TO30:NEXTT
26 NEXTP
27 GOTO23
28 LINE(0,V)-(255,V),PSET:RETURN
29 FORR=1TO230STEP6
30 CIRCLE(128,96),R,,.75
31 NEXT:RETURN
```

Listing 3

```
1 CLS(3)
2 PRINT@233,"MOIRE FRINGES";
3 PRINT@264,"CIRCLES/CIRCLES";
4 PRINT@302,"BY";
5 PRINT@361,"THE DELBOURGOS";
6 FORS=1TO240STEP10:SOUNDS,1
7 NEXT
8 PCLEAR8
9 C1=RND(3)+1:C2=RND(3)+1
10 SC=RND(2)-1
11 PMODE1,1:COLORC1,1:PCLS
12 SCREEN1,SC
13 FORR=0TO95STEP3:GOSUB28:NEXT
14 COLORC2,1:GOSUB29
15 PMODE1,3:COLORC1,1:PCLS
16 SCREEN1,SC
17 FORR=1TO95STEP3:GOSUB28:NEXT
18 COLORC2,1:GOSUB29
19 PMODE1,5:COLORC1,1:PCLS
20 SCREEN1,SC
21 FORR=2TO95STEP3:GOSUB28:NEXT
22 COLORC2,1:GOSUB29
23 FORP=1TO5STEP2:PMODE1,P
24 SCREEN1,SC
25 FORT=1TO30:NEXTT
26 NEXTP
27 GOTO23
28 CIRCLE(134,96),R:RETURN
29 FORS=0TO95STEP3
30 CIRCLE(122,96),S
31 NEXT:RETURN
```

Listing 4

```
1 CLS(2)
2 PRINT@233,"MOIRE FRINGES";
3 PRINT@264,"LINES/PARABOLAS";
4 PRINT@302,"BY";
5 PRINT@361,"THE DELBOURGOS";
6 FORS=240TO1STEP-10:SOUNDS,1
7 NEXT
8 PCLEAR8
9 C1=RND(3)+1:C2=RND(3)+1
10 SC=RND(2)-1
11 PMODE1,1:COLORC1,1:PCLS
12 SCREEN1,SC
```

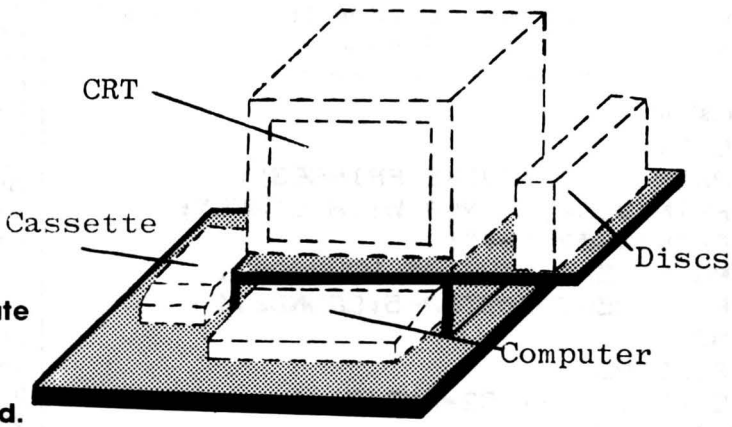

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```
13 FORH=ØTO191STEP3:GOSUB28:NEXT
14 COLORC2,1:GOSUB29
15 PMODE1,3:COLORC1,1:PCLS
16 SCREEN1,SC
17 FORH=1TO191STEP3:GOSUB28:NEXT
18 COLORC2,1:GOSUB29
19 PMODE1,5:COLORC1,1:PCLS
20 SCREEN1,SC
21 FORH=2TO191STEP3:GOSUB28:NEXT
22 COLORC2,1:GOSUB29
23 FORP=1TO5STEP2:PMODE1,P
24 SCREEN1,SC
25 FORT=1TO30:NEXTT
26 NEXTP
27 GOTO23
28 LINE(Ø,H)-(255,H),PSET:RETURN
29 FORA=ØTO191STEP20:FORS=ØTO255
30 X=(S-128)/128:Y=X*X*191
31 B=Y+A:IFB>191THENB=191
32 PSET(S,B,C2):NEXTS:NEXTA
33 RETURN
```

Software Review. . .

Two New RS Disk Programs Offer A Lot

By Robert E. Foiles

Radio Shack's two disk programs for the Color Computer have found their way into the pipeline and are on sale in some areas. Since I had been in to see the good folks at our local Radio Shack Computer Center almost weekly asking about the arrival of two disk programs, it was not a surprise to me to be greated by "they're here! now!" coming from the sales team when I stopped by recently.

With my charge card in hand, I moved to the counter to pick up the ordered copies of the new disk programs. The items come bound in the colorful three-ring binder (like *Art Gallery*) and like their preceding rom packs, both were created by Robert G. Kilgus then licensed to Tandy Corporation.

Both manuals are very well written and specific information is cross referenced when necessary (an improvement over the rom pack manuals). The two programs also share the same price, that is, they sell for $59.95.

I have used both *Color Scripsit* and *Spectaculator* rom packs since they became available in our area. Thus, I felt right at home with the new programs. (Needless to say, since they are from the same author, one would expect them to be much the same.)

The experience with the rom packs is a very useful base from which to judge the new versions. The functions each program is to provide should be the same or better than the rom pack versions. On this scale, both programs have new functions but suffer from other problems. The trade off may be worth it for the individual user, but be prepared to accept the fact that you can't have the cake and eat it too. The first trade off (for both programs) is speed of operation and loss of memory.

Operations

Either program must be loaded following the disk system procedures (after the backup copy and "run" copy have been made). The user is urged to use the "run" copy created through the BACKUP routine to save the "source" disk from damage. If the user is a first time disk user, the manual goes into detail instructions to accomplish the BACKUP (including formatting the blank disk beforehand), so even if such a user did not read the Disk System Manual, the information is at hand. The loading time is longer than the rom packs and the selection of the options listed rerquire the disk to move to that section to load the sub-program before it runs. The time lag is something any user will learn to live with, but the first time through the routine, one remembers the speed of the rom packs. To exit the programs, the user must follow a couple of extra steps to protect the disk. Again, something one can learn to live with, but in *Scriptsit's* case, the need to go through the Main Menu to get to a sub-menu to exit, seems a round about route.

Disk Color Scripsit

Both programs share some of the same general operations called for by the fact the programs are on disk. *Disk Scripsit* provides an overlay for the keyboard, which names the functions the user may select—a nice touch for those who did not have to learn the key codes through use of the rompack. (*Spectaculator* does not have an overlay.)

Disk Scripsit produces the same red and yellow Main Menu as the rom pack. The user is offered the options found in the rom pack, and much more. The Clear Memory option works the same in rom pack and disk. The use of the command wipes the "page" clean. The Edit Text option has one of the new additions to the disk version. The user can select either the regular all upper case letters (capitals show up on the screen in reverse color) or the use of graphic

Continued on Page 120



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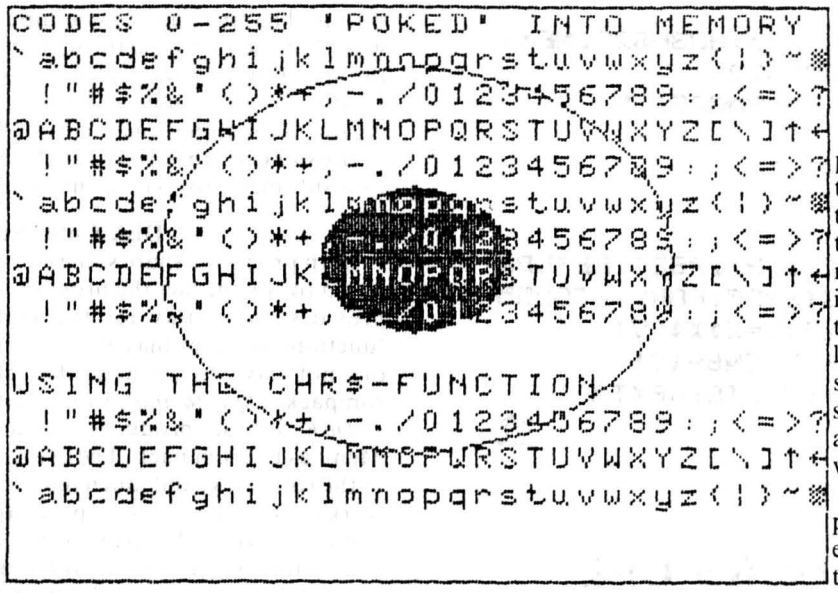
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1024 Bainbridge Pl. Columbus, OH 43228

Graphics Utility...

Now, Really Combine Your Graphics And Characters!

By Chris Hall



One of the problems with doing graphs and other graphic representations on the Color Computer is the difficulty in combining the graphic figures with the appropriate titles and labels. Although characters can be easily drawn by forming letters using Basic's DRAW command, that can take up a lot of space.

The other way to do it has been to set up a routine which has all the letters "drawn" in advance, merge that with the actual program you are using to draw the the graph or graphic, and then simply label the figure by calculating the position the letters are to start on the graphic screen.

So, we can define problem number one as the difficulty in getting the graphic "letters" in the program itself. While merge is easy with disk, it is less so with tape. And, the option of typing in the long list of DRAW statements for the letter strings is not particularly appealing. Besides, it is wasteful of memory.

Problem two is the placing of the characters exactly where you want them. Basic has an absolutely marvelous command called PRINT @, but this cannot be used with the graphics screen—until now, anyway.

The program below, *TCOPY* is a machine language subroutine that is capable of making a direct copy of the text

"This program is absolutely excellent" Sept., '81 RAINBOW

TEXT EDITOR

By John Waclo

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16K - Special screen display, Save text, Add to text, Find locations of any word. Edit, Insert, Delete, Replace any line of text. Plus Auto Line-Centering! Output to any printer with full control over Left Margin, Right Margin, Line Spacing, Paging, Length of Form, Number of Copies, and right-side Justification. Re-format entered text; Menu driven. Draft of text; full or partial. FREE upgrade to 32K software...and more.

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$49.95 Tape -- $59.95 Disk ‡ Includes Manual ‡ Extended Basic required

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screen and placing it on the current high-resolution (PMODE4) graphics screen. Any characters put on the text screen—including those with PRINT @ and PRINT USING will be copied!

The complete 96 character ASCII set is supported and lower-case letters will appear on the graphics screen with descenders. Characters which are not supported (such as the low resolution graphics symbols) are simply mapped on to the table of ASCII characters.

To access *TCOPY*, use CLOADM or LOADM to place it in memory. It was assembled to location zero, so you should include an offset (CLOADM "PROGRAM",14000 for instance) to place it where you want it. It is written in position-independent code. It can then be called, via the USR function, from Extended Basic. A short demonstration program is included here as Listing 1.

For those of you generally unfamiliar with machine language program entry, as required by Listing 2, there are two methods of getting the program into memory.

The first is to use the *MINIMON* program and instructions from *Chralie's Machine* in last month's issue. The other is to use the program offered in that column to POKE the numbers in the second column of Listing 2 (the hexadecimal numbers) into the memory locations shown in the first column. In either case, you should offset load the program as indicated above to keep it out of the way of a Basic program you may wish to write using this technique.

The Listings:

Listing 1

```
10 ' DEMO PROGRAM FOR T COPY
20 '
30 '
50 CLEAR200,30000
60 LOADM "TCOPY",30000:'FOR DISK
-USE CLOADM FOR TAPE
70 PMODE 4,1:PCLS
80 DEF USR0=30000
90 CLS
100 '
110 PRINT "CODES 0-255 POKES INT
O MEMORY"
120 FOR I=0 TO 255
130 POKE &H420+I,I
140 NEXT I
150 '
160 PRINT@320,"USING THE CHR$-FU
NCTION:"
170 FOR I=32 TO 127
180 PRINTCHR$(I);
190 NEXT I
200 ' DISPLAY SOME GRAPHICS
210 LINE (0,0)-(255,191),PSET,B
220 SCREEN 1,0
230 CIRCLE (127,85),30,1,.8046
240 PAINT (127,85),1
245 CIRCLE (127,85),80,1,.8046
250 '
260 'CALL TCOPY
270 '
```




```
280 X=USR0(0)
290 ' FLIP BACK AND FORTH BETWEE
N SCREENS
300 IF INKEY$<>"" THEN SCREEN 0,
0 ELSE 300
310 IF INKEY$<>"" THEN SCREEN 1,
0 ELSE 310
320 GOTO300
```

Listing 2

```
                        *
                        *
                        *     TCOPY - Copy Text Screen to Graphics Page
                        *                 August 1982
                        *
                        *  This BASIC-callable subroutine transfers the "Text"
                        *  screen display to the current "Graphics" page. Each
                        *  ASCII-character code is associated with an 8 x 12 bit
                        *  array which is then put into graphics memory.
                        *
                        *  NOTE: This subroutine is relocatable.
                        *
                              NAM   TCOPY
                              OPT   NOG
0000                          ORG   0
0000 3420               TCOPY PSHS  Y
                        * Text screen pointer.
0002 8E0400                   LDX   #$400
0005 AF8C5D                   STX   <TPOS,PCR
                        * Graphics screen pointer.
0008 9E8A                     LDX   $8A
000A AF8C56                   STX   <GPOS,PCR
                        *
                        *     ROW LOOP
                        *
000D 8610                     LDA   #16
000F A78C55                   STA   <ROW,PCR
                        *
                        *   COLUMN LOOP
                        *
0012 8620               RLOOP LDA   #32
0014 A78C51                   STA   <COL,PCR
                        * Get text character.
0017 AE8C4B             CLOOP LDX   <TPOS,PCR
001A A684                     LDA   0,X
                        * Character must be < 128.
001C 847F                     ANDA  #%01111111
                        * Translate 128-char set to 96-chars.
001E 8160                     CMPA  #96
0020 2D02                     BLT   OK
0022 8040                     SUBA  #64
                        * Increment Pointer.
0024 3001               OK    LEAX  1,X
0026 AF8C3C                   STX   <TPOS,PCR
                        * Set X-Reg to table entry.
0029 C60C                     LDB   #12             D=A*12
002B 3D                       MUL
002C 308C3A                   LEAX  <TABLE,PCR  X=TABLE+D
002F 308B                     LEAX  D,X
                        *
                        *     COPY 12-BYTE CELL
                        *     TO GRAPHIC SCREEN
                        *
0031 10AE8C2E                 LDY   <GPOS,PCR
0035 5F                       CLRB
                        * Get entry from table.
0036 A685               LOOP  LDA   B,X
                        * Exclusive-OR with graphic cell.
0038 A8A4                     EORA  0,Y
003A A7A4                     STA   0,Y
003C 31A820                   LEAY  32,Y
003F 5C                       INCB
0040 C10B                     CMPB  #11
0042 2FF2                     BLE   LOOP
                        *
                        * Next column.
0044 AE8C1C                   LDX   <GPOS,PCR
0047 3001                     LEAX  1,X             GPOS=GPOS+1
0049 AF8C17                   STX   <GPOS,PCR
004C 6A8C19                   DEC   <COL,PCR
004F 26C6                     BNE   CLOOP
                        *
                        * Next row.
0051 AE8C0F                   LDX   <GPOS,PCR   GPOS=GPOS+352
```

COLOR SALES FILE

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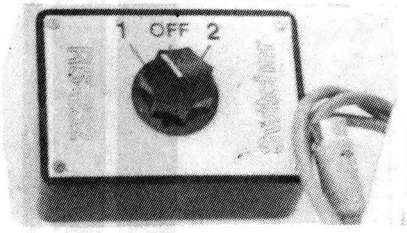
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```
0054 30890160           LEAX  352,X
0058 AF8C08             STX   <GPOS,PCR
005B 6A8C09             DEC   <ROW,PCR
005E 26B2               BNE   RLOOP
                *
                * Return.
0060 3520               PULS  Y
0062 39                 RTS
                *
                *   VARIABLE STORAGE
                *
                * Pointers.
0063            GPOS    RMB   2
0065            TPOS    RMB   2
                * Counters.
0067            ROW     RMB   1
0068            COL     RMB   1
                *
                *   CHARACTER TABLE
                *
0069            TABLE   EQU   *
0069 00                 FCB   0,0,0,$20,$10,$8,0,0,0,0,0,0          ACCENT GRAVE
0075 00                 FCB   0,0,0,0,0,$1C,$2,$1E,$22,$1D,0,0      a
0081 00                 FCB   0,0,0,$20,$20,$2C,$32,$22,$22,$3C,0,0 b
008D 00                 FCB   0,0,0,0,0,$1E,$20,$20,$20,$1E,0,0     c
0099 00                 FCB   0,0,0,$1,$1,$1D,$23,$21,$21,$1F,0,0   d
00A5 00                 FCB   0,0,0,0,0,$1C,$22,$3C,$20,$1C,0,0     e
00B1 00                 FCB   0,0,0,$C,$12,$10,$38,$10,$10,$10,0,0  f
00BD 00                 FCB   0,0,0,0,0,0,$1C,$22,$22,$1E,$2,$1C    g
00C9 00                 FCB   0,0,0,$20,$20,$2C,$32,$22,$22,$22,0,0 h
00D5 00                 FCB   0,0,0,$8,0,$18,$8,$8,$8,$1C,0,0      i
00E1 00                 FCB   0,0,0,0,$4,0,$4,$4,$4,$4,$14,$8       j
00ED 00                 FCB   0,0,0,$20,$20,$24,$28,$30,$28,$24,0,0 k
00F9 00                 FCB   0,0,0,$18,$8,$8,$8,$8,$8,$1C,0,0     l
0105 00                 FCB   0,0,0,0,0,$34,$2A,$2A,$2A,$22,0,0    m
0111 00                 FCB   0,0,0,0,0,$2C,$12,$12,$12,$12,0,0    n
011D 00                 FCB   0,0,0,0,0,$1C,$22,$22,$22,$1C,0,0    o
0129 00                 FCB   0,0,0,0,0,$3C,$22,$22,$22,$3C,$20,$20 p
0135 00                 FCB   0,0,0,0,0,$1E,$22,$22,$22,$1E,$2,$2  q
0141 00                 FCB   0,0,0,0,0,$2C,$32,$20,$20,$20,0,0    r
014D 00                 FCB   0,0,0,0,0,$1C,$20,$1C,$2,$3C,0,0     s
0159 00                 FCB   0,0,0,$10,$10,$38,$10,$10,$11,$E,0,0 t
0165 00                 FCB   0,0,0,0,0,$24,$24,$24,$24,$1A,0,0    u

0171 00                 FCB   0,0,0,0,0,$22,$22,$14,$14,$8,0,0     v
017D 00                 FCB   0,0,0,0,0,$22,$22,$2A,$2A,$14,0,0    w
0189 00                 FCB   0,0,0,0,0,$22,$14,$8,$14,$22,0,0     x
0195 00                 FCB   0,0,0,0,0,$22,$22,$22,$22,$1E,$2,$3C y
01A1 00                 FCB   0,0,0,0,0,$3E,$4,$8,$10,$3E,0,0      z
01AD 00                 FCB   0,0,0,$4,$8,$8,$10,$8,$8,$4,0,0      L. ELLIPSIS
01B9 00                 FCB   0,0,0,$8,$8,$8,0,$8,$8,$8,0,0        VERT. BAR
01C5 00                 FCB   0,0,0,$10,$8,$8,$4,$8,$8,$10,0,0     R. ELLIPSIS
01D1 00                 FCB   0,0,0,0,$12,$2C,0,0,0,0,0,0          TILDE
01DD 00                 FCB   0,0,0,$14,$2A,$14,$2A,$14,$2A,$14,0,0 DEL
01E9 00                 FCB   0,0,0,0,0,0,0,0,0,0,0,0               BLANK
01F5 00                 FCB   0,0,0,$8,$8,$8,$8,$8,0,$8,0,0        !
0201 00                 FCB   0,0,0,$14,$14,$14,0,0,0,0,0,0        "
020D 30                 FCB   0,0,0,$14,$14,$3E,$14,$3E,$14,$14,0,0 #
0219 00                 FCB   0,0,0,$8,$1E,$20,$1C,$2,$3C,$8,0,0   $
0225 00                 FCB   0,0,0,$32,$32,$4,$8,$10,$26,$26,0,0  %
0231 00                 FCB   0,0,0,$10,$28,$28,$10,$2A,$24,$1A,0,0 &
023D 00                 FCB   0,0,0,$18,$18,$18,0,0,0,0,0,0        '
0249 00                 FCB   0,0,0,$4,$8,$10,$10,$10,$8,$4,0,0    (
0255 00                 FCB   0,0,0,$10,$8,$4,$4,$4,$8,$10,0,0     )
0261 00                 FCB   0,0,0,$8,$2A,$1C,$1C,$2A,$8,0,0,0    *
026D 00                 FCB   0,0,0,0,$8,$8,$3E,$8,$8,0,0,0        +
0279 00                 FCB   0,0,0,0,0,0,0,0,8,8,$10,0            ,
0285 00                 FCB   0,0,0,0,0,0,$3E,0,0,0,0,0            -
0291 00                 FCB   0,0,0,0,0,0,0,0,$18,$18,0,0          .
029D 00                 FCB   0,0,0,$2,$2,$4,$8,$10,$20,$20,0,0    /
02A9 00                 FCB   0,0,0,$18,$24,$24,$24,$24,$24,$18,0,0 0
02B5 00                 FCB   0,0,0,$8,$18,$8,$8,$8,$8,$1C,0,0     1
02C1 00                 FCB   0,0,0,$1C,$22,$2,$C,$10,$20,$3E,0,0  2
02CD 00                 FCB   0,0,0,$1C,$22,$2,$C,$2,$22,$1C,0,0   3
02D9 00                 FCB   0,0,0,$4,$C,$14,$24,$3E,$4,$4,0,0    4
02E5 00                 FCB   0,0,0,$3E,$20,$3C,$2,$2,$22,$1C,0,0  5
02F1 00                 FCB   0,0,0,$E,$10,$20,$3C,$22,$22,$1C,0,0 6
02FD 00                 FCB   0,0,0,$3E,$2,$4,$8,$10,$20,$20,0,0   7
0309 00                 FCB   0,0,0,$1C,$22,$22,$1C,$22,$22,$1C,0,0 8
0315 00                 FCB   0,0,0,$1C,$22,$22,$1E,$2,$4,$38,0,0  9
0321 00                 FCB   0,0,0,0,0,0,8,0,8,0,0,0              :
032D 00                 FCB   0,0,0,0,0,0,8,0,8,8,$10,0            ;
0339 00                 FCB   0,0,0,$4,$8,$10,$20,$10,$8,$4,0,0    <
0345 00                 FCB   0,0,0,0,0,$3E,0,$3E,0,0,0,0          =
0351 00                 FCB   0,0,0,$10,$8,$4,$2,$4,$8,$10,0,0     >
035D 00                 FCB   0,0,0,$1C,$22,$4,$8,$8,0,$8,0,0      ?
0369 00                 FCB   0,0,0,$1C,$22,$2,$1A,$2A,$2A,$1C,0,0 @
0375 00                 FCB   0,0,0,$8,$14,$22,$22,$3E,$22,$22,0,0 A
0381 00                 FCB   0,0,0,$3C,$12,$12,$1C,$12,$12,$3C,0,0 B
038D 00                 FCB   0,0,0,$1C,$22,$20,$20,$20,$22,$1C,0,0 C
0399 00                 FCB   0,0,0,$3C,$12,$12,$12,$12,$12,$3C,0,0 D
03A5 00                 FCB   0,0,0,$3E,$20,$20,$38,$20,$20,$3E,0,0 E
03B1 00                 FCB   0,0,0,$3E,$20,$20,$38,$20,$20,$20,0,0 F
03BD 00                 FCB   0,0,0,$1E,$20,$20,$26,$22,$22,$1E,0,0 G
03C9 00                 FCB   0,0,0,$22,$22,$22,$3E,$22,$22,$22,0,0 H
```

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RAINBOW CERTIFICATION SEAL

```
03D5 00                 FCB   0,0,0,$1C,$8,$8,$8,$8,$8,$1C,0,0        I
03E1 00                 FCB   0,0,0,$2,$2,$2,$2,$2,$2,$22,$1C,0,0      J
03ED 00                 FCB   0,0,0,$22,$24,$28,$30,$28,$24,$22,0,0    K
03F9 00                 FCB   0,0,0,$20,$20,$20,$20,$20,$20,$3E,0,0    L
0405 00                 FCB   0,0,0,$22,$36,$2A,$2A,$22,$22,$22,0,0    M
0411 00                 FCB   0,0,0,$22,$32,$2A,$26,$22,$22,$22,0,0    N
041D 00                 FCB   0,0,0,$1C,$22,$22,$22,$22,$22,$1C,0,0    O
0429 00                 FCB   0,0,0,$3C,$22,$22,$3C,$20,$20,$20,0,0    P
0435 00                 FCB   0,0,0,$1C,$22,$22,$22,$2A,$24,$1A,0,0    Q
0441 00                 FCB   0,0,0,$3C,$22,$22,$3C,$28,$24,$22,0,0    R
044D 00                 FCB   0,0,0,$1C,$22,$10,$8,$4,$22,$1C,0,0      S
0459 00                 FCB   0,0,0,$3E,$8,$8,$8,$8,$8,$8,0,0          T
0465 00                 FCB   0,0,0,$22,$22,$22,$22,$22,$22,$1C,0,0    U
0471 00                 FCB   0,0,0,$22,$22,$22,$14,$14,$8,$8,0,0      V
047D 00                 FCB   0,0,0,$22,$22,$22,$2A,$2A,$36,$22,0,0    W
0489 00                 FCB   0,0,0,$22,$22,$14,$8,$14,$22,$22,0,0     X
0495 00                 FCB   0,0,0,$22,$22,$14,$8,$8,$8,$8,0,0        Y
04A1 00                 FCB   0,0,0,$3E,$2,$4,$8,$10,$20,$3E,0,0       Z
04AD 00                 FCB   0,0,0,$1C,$10,$10,$10,$10,$10,$1C,0,0    [
04B9 00                 FCB   0,0,0,$20,$20,$10,$8,$4,$2,$2,0,0        \
04C5 00                 FCB   0,0,0,$1C,$4,$4,$4,$4,$4,$1C,0,0         ]
04D1 00                 FCB   0,0,0,$8,$1C,$2A,$8,$8,$8,$8,0,0         ^
04DD 00                 FCB   0,0,0,0,$8,$10,$3E,$10,$8,0,0,0          BACK-ARROW
0000                    END   TCOPY
        NO ERROR(S) DETECTED


   SYMBOL TABLE:

CLOOP  0017     COL    0068     GPOS   0063     LOOP   0036
NARG   0000     OK     0024     RLOOP  0012     ROW    0067
TABLE  0069     TCOPY  0000     TPOS   0065

CMD=TCOPY/PN
```

Animals...

16K ECB

Now, Let's Hear It For The Cats Too!

Could it be that *the Rainbow* is biased? Thus far, there has been quite a bit of mention of one sort of domestic animal—the canine—with nary a word in all these pages about the other most popular household pet—the cat.

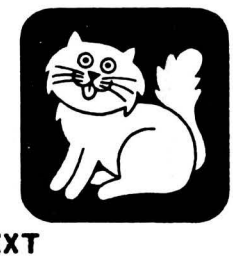
Mike Speer seeks to set things on an even keel with this program listed below. *MOMMACAT* will simulate the sound of a mother cat's heartbeat.

The program could be restful in itself (for humans). Or, if you have just brought a kitten home with you, you might wish to let kitty curl up with *MOMMACAT* when it gets lonesome for Momma Cat.

Mr. Speer advises you can make the heartbeat go faster or slower by "fiddling" with the variable HRTB in line 10. The program is set for 158 heartbeats a minute.

The Listing:

```
5 'MOMMA CAT HEARTBEAT
6 'BY MIKE SPEER
10 HRTB=128
20 R=15
30 B$="V<C"
40 A$="V<EF"
50 PLAY "V31T10003"
60 PLAY "XA$;"
70 FOR I=1 TO (R):NEXT
80 PLAY "V31"
90 FOR I=1 TO 4:PLAY "XB$;":NEXT
:FOR I=1 TO (HRTB):NEXT:GOTO50
```



Game...

16K ECB

If You Went Sailin'. . . Now Try A Bit Of Rowing

By Geoff Wells

If you liked the *Sailin'* program in last month's issue of *the Rainbow*, you might be one of those people who likes to try their hand on the water.

But sailing is hard. There are currents, winds, rudders and so forth. Rowing is easier, there are just a couple of oars and they are pretty easy to handle.

That is if it wasn't for the currents. And, while winds and the rudder are absent here, there is a current. In fact, it can be a pretty swift one. And, did we mention the rapids? No? Well, you see . . .

Vectors is a simple program that lets you make your way across a river and tie up at a dock. If you row just right, you will make it across—you need some speed to keep from getting caught in the current. But, if you arrive too fast, you will knock the dock to bits. Could be a problem.

The program is pretty much self-prompting as to the way you should play.

And, in typing this in, notice the use of *INKEY$*. The computer, after all, is a device that is designed to improve speed and efficiency. Why, then, is it that so many programs force us to use unnecessary key strokes?

The answer can only be laziness or lack of knowledge on the part of the programmer. The *INKEY$* function is one of the most simple and, yet, most powerful ways to direct program flow. It may take a few extra lines of code and a little ingenuity, but the results will be worth it.

INKEY$* can be used to set up a pseudo "do until" loop as any single keystroke is stored until *INKEY$ checks to see if a key has been pressed. You can verify this with a short test:

```
A$=INKEY$: IF A$="" THEN 20 ELSE PRINT A$:
GOTO10
FOR X=1 TO 2000: NEXT X
PRINT "INKEY$=";: GOTO10
```

The flow graphics of the *Vector* program below use this technique to simulate water movement while waiting for you to input your instructions.

Another point worth mentioning is how to surpress the automatic scrolling of text when printing on Line 16 of the screen. Even with a semicolon at the end of your print statement, if your text reaches the right-hand bottom corner, the text will scroll—leaving you with a blank line at the bottom of the screen.

To avoid this, *POKE* your last character into 1535 and the screen will not scroll. This is used in lines 150 and 6070 of *Vectors* to draw and erase the north arrow.

The Listing:

```
1 '***VECTORS***
2 'GEOFF WELLS
3 '21-12 EAST AVE. N.
```


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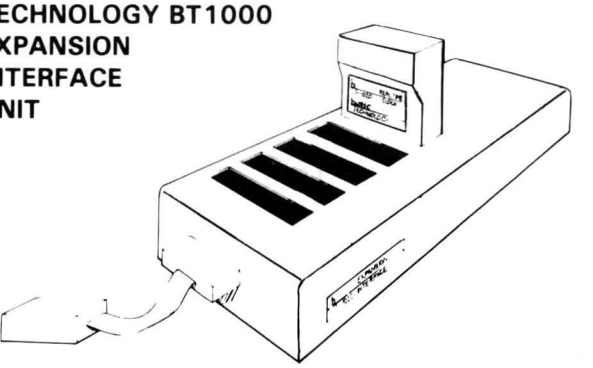
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```
4 'HAMILTON
5 'ONTARIO
6 'CANADA
7 'L8L 5H2
8 '1-416-529-1319
9 '
10 '
20 REM INSTRUCTIONS
30 GOSUB 9020:GOSUB 11020
40 '
50 REM SET UP SCREEN
60 W1$=STRING$(32,CHR$(175))
70 W2$=STRING$(5,CHR$(175))+CHR$
(159)
80 W3$=STRING$(26,CHR$(128))
90 CLS0
100 PRINT STRING$(32,CHR$(159));
110 FOR X=1 TO 7:PRINT W1$;:NEXT
 X
120 PRINT W2$;STRING$(26,CHR$(15
9));
130 FOR X=1 TO 6:PRINT W2$+W3$;:
NEXT X
140 PRINTW2$;
150 POKE 1064,68:POKE 1504,173:P
OKE 1505,168:POKE 1507,165:POKE
1508,174:POKE 1535,30:POKE 1503,
14
160 X=63:Y=14:BA=270:RA=270
170 '
500 '
510 REM LOOP STARTS HERE
520 SET (X,Y,8):RF=(64-X)/2
530 PRINT@327,"AZIMUTH OF BOAT="
BA" ";
540 PRINT@391,"RIVER SPEED="RF"
  ";
550 PRINT@455,"COMMAND?";
560 IF POINT(18,2)=8 THEN 5010
570 IF Y<4 AND X<18 THEN PRINT@3
2,W1$;:GOTO 4020
580 '
1000 '
1010 REM INPUT PLAYERS MOVE
1020 POKE 1488,96
1030 M$=INKEY$:IF M$="" THEN P=1
:GOTO 3010
1040 IF M$="R" OR M$="L" OR M$="
B" THEN POKE 1488,ASC(M$):OAR$=M
$:ELSE SOUND 10,1:GOTO 1030
1050 POKE 1490,96
1060 M$=INKEY$:IF M$="" THEN P=2
:GOTO 3010
1070 IF VAL(M$)>0 AND VAL(M$)<10
 THEN POKE 1490,(ASC(M$)+64):FC=
VAL(M$):ELSE SOUND 10,1:GOTO 106
0
1080 IF OAR$="B" THEN BF=FC:GOTO
 1510 ELSE BF=0
1090 IF OAR$="R" THEN BA=BA-FC*1
0:IF BA<0 THEN BA=360-ABS(BA)
1100 IF OAR$="L" THEN BA=BA+FC*1
0:IF BA=>360 THEN BA=BA-360
1110 '
1500 '
1510 REM THE CALCULATIONS
1520 '
1530 REM RIVER VECTOR
1540 NR=RF*COS(RA/57.29577951)
1550 ER=RF*SIN(RA/57.29577951)
1560 '
1570 REM BOAT VECTOR
1580 NB=BF*COS(BA/57.29577951)
1590 EB=BF*SIN(BA/57.29577951)
1600 NV=NR+NB:EV=ER+EB:NV=FIX(NV
):EV=FIX(EV)
1610 SET(X,Y,3)
1620 X=X+EV:Y=Y-NV
1630 IF X>63 THEN X=63
1640 IF Y>14 THEN Y=14
1650 IF Y<2 THEN Y=2
1660 IF X<10 THEN 4510
1670 GOTO 520
1680 REM LOOP ENDS HERE
1690 '
1700 '
2000 REM THE SUB-ROUTINES
2010 '
3000 '
3010 REM FLOW GRAPHICS
3020 F1=RND(11)+4
3030 F2=RND(51)+12
3040 FOR FG=F2 TO F2-3 STEP -1
3050 IF POINT (FG,F1)=8 THEN NEX
T FG ELSE SET(FG,F1,5):SET(FG,F1
,3):NEXT FG
3060 F1=RND(24)+2
3070 F2=RND(9)
3080 FOR FG=F1 TO F1+3:SET(F2,FG
,5):SET(F2,FG,3):NEXT FG
3090 ON P GOTO 1030,1060,7040
3100 '
4000 '
4010 REM LOSE---DOCK COLLAPSE
4020 GOSUB 8010
4030 GOSUB 6010
4040 PRINT@332,"DOCK COLLAPSED";
4050 PRINT@364,"YOU SMASHED ON";
4060 PRINT@399,"THE ROCKS";
4070 GOTO 7020
4080 '
4500 '
4510 REM LOSE---MISS DOCK
4520 GOSUB 8010
4530 GOSUB 6010
4540 PRINT@334,"MISSED DOCK";
4550 PRINT@364,"YOU DROWNED IN";
4560 PRINT@399,"THE FALLS";
```

```
4570 GOTO 7020
4580 '
5000 '
5010 REM WIN
5020 GOSUB 6010
5030 PRINT@332,"CONGRATULATIONS"
;
5040 PRINT@396,"PERFECT DOCKING"
;
5050 PLAY T$
5060 GOTO 7020
5070 '
6000 '
6010 REM DRAW BOAT
6020 PP=327:B=21
6030 FOR DB=1 TO 5
6040 PRINT@PP, STRING$(DB,CHR$(1
28))+CHR$(253)+STRING$(B,CHR$(25
5))+CHR$(254)+STRING$(DB,CHR$(12
8));
6050 B=B-2:PP=PP+32
6060 NEXT DB
6070 POKE 1535,128
6080 RETURN
6090 '
7000 '
7010 REM NEW GAME?
7020 P=3
7030 PRINT@465,"AGAIN?";
7040 M$=INKEY$:IF M$="" THEN 301
0
7050 IF M$="Y" THEN 90
7060 CLS:PRINT@235,"LANDLUBBER"
7070 END
8000 '
8010 REM OVER THE FALLS
8020 POKE 1218,255
8030 FOR S=255 TO 230 STEP-2:SOU
ND S,1:NEXT S
8040 POKE 1218,175:POKE 1250,255
8050 FOR S=230 TO 205 STEP-2:SOU
ND S,1:NEXT S
8060 POKE 1250,175:POKE 1282,255
8070 FOR S=205 TO 180 STEP-2:SOU
ND S,1:NEXT S
8080 POKE 1282,175:POKE 1314,255
8090 FOR S=180 TO 155 STEP-2:SOU
ND S,1:NEXT S
8100 POKE 1314,175:POKE 1346,255
8110 FOR S=155 TO 130 STEP-2:SOU
ND S,1:NEXT S
8120 POKE 1346,175:POKE 1378,255
8130 FOR S=130 TO 105 STEP-2:SOU
ND S,1:NEXT S
8140 POKE 1378,175:POKE 1410,255
8150 FOR S=105 TO 80 STEP-2:SOUN
D S,1:NEXT S
8160 POKE 1410,175:POKE 1442,255
8170 FOR S=80 TO 55 STEP-2:SOUND
 S,1:NEXT S
8180 POKE 1442,175:POKE 1474,255
```


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Look at these features!!

- Fully protected power supply
  5 Volts @ 2 Amps, ±12 Volts @ .25 Amps
- Five expansion slots with all data and control lines
- Four 24-pin RAM/EPROM sockets, switch selectable
- 256 bytes of reserved I/O
- Plugs directly into the CC cartridge slot
  No mods or wires to change.

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PROGRAMMABLE REAL TIME CLOCK/CALANDER plugs directly into the CC expansion slot or into the BT1000 Expansion Interface Unit. Gives day, date and time for your reports, Flex* Files letters, or data printouts. Based on the MC146818, the BT-1020 includes a 100 year clock, 50 bytes of keep-alive CMOS memory, 32.748 khz crystal control and battery back-up. Keeps time and holds memory when your computer is turned off or the cartridge is removed from the cartridge slot.

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180 Day warranty on BT1000 and BT1020 includes parts and labor. Write for free brochure.

BT-1000 incl. cable	$270
BT-1000 w/8K SRAM	$300
BT-1020 Clock/Cal.	$109
BT-1010 Exper. Bd	$ 19

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Add $5.00 S+H for BT-1000, $2.50 for all others.
Check or Money order, VISA, MC accepted (give account no., expiration date and phone number). Personal checks require 2-3 weeks to clear.
COD req's cash, certified check or money order plus $2.00. Overseas add 15%.
Michigan residents add 4% sales tax.
*FLEX is a TM of TSC, INC.

```
8190 FOR S=55 TO 30 STEP-2:SOUND
 S,1:NEXT S
8200 POKE 1474,175:POKE 1506,255
8210 SOUND 1,10
8220 RETURN
8230 '
9000 '
9010 REM INSTRUCTIONS
9020 CLS
9030 PRINT:PRINT@41,"**VECTORS**
"
9040 PRINT:PRINT" DO YOU NEED IN
STRUCTIONS (Y/N)"
9050 M$=INKEY$:IF M$="" THEN 905
0
9060 IF M$="N" THEN RETURN
9070 PRINT@96," YOU MUST ROW YOU
R BOAT ACROSS   THE RIVER, TO TH
E DOCK.    d";CHR$(255)
9080 PRINT" THE CLOSER YOU GET T
O THE FALLS THE FASTER THE RIVER
 FLOWS."
9090 PRINT" YOU COMMAND THE OARS
 AND THE    FORCE OF THE STROKE.
"
9100 PRINT:PRINT" **rIGHT***1EFT
***bOTH***(1-9)**"
9110 PRINT" IF YOU HIT THE DOCK
TOO HARD    IT WILL COLLAPSE."
9120 PRINT" GOOD LUCK AND HAPPY
BOATING"
9130 PRINT"
   <ENTER>";
9140 M$=INKEY$:IF M$="" THEN 914
0 ELSE RETURN
10000 '
10010 '
10020 REM VARIABLE LIST
10030 'X-Y SET AXIS
10040 'BA-BOAT ANGLE
10050 'RA-RIVER ANGLE (OF FORCE)
10060 'RF-RIVER FORCE
10070 'BF-BOAT FORCE (BOTH OARS)
10080 'FC-FORCE OF STROKE
10090 'NV-EV NORTH/EAST COMBINED
 VECTORS
10100 PP-PRINT POSITION
10110 '
11000 '
11010 REM THE MUSIC
11020 T1$="O2;T5;L3;G+;L4;B;P100
;B;P100;B;L2;A;L4;G+;L3;B"
11030 T2$="T6;P3;B;L4;C+;A;C+;L2
;E;L4;C+;L3;B"
11040 T3$="T7;P3;B;L4;C+;A;C+;E;
D+;C+;B;C+;B;G+;O1;E;O2;G+;B;C+;
B;L2;A;L4;O1;F+;L3;E;"
11050 T4$="V31;P1;L1;B;P1;B;V15"
11060 T$="XT1$;XT2$;XT3$;XT4$;"
11070 RETURN
```


Own a TRS-80 Color Computer? Wish you had Lower Case?

For $75.00 and five minutes of your time you can have full upper and true lowercase (not just reverse video) with the LCA-47 lowercase adapter from Micro Technical Products.

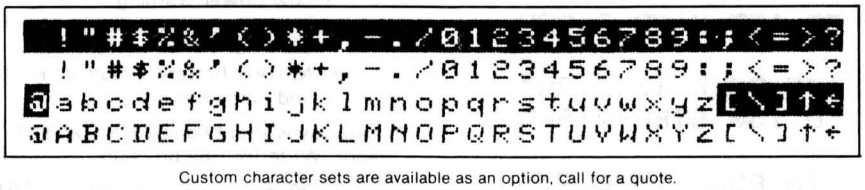
What is it? The LCA-47 is a small PC board (1.9 × 3.6 in.) that plugs into your computer's main PC board: leaves the expansion connector free. It doesn't take up any system memory: uses a fast Bipolar Character Generator for guaranteed operation.

Installation is quick and simple: no cutting or soldering required.

Fully assembled, tested, and guaranteed for 1 full year.

Two switches provided on board: one to enable or disable the lowercase. The other to invert the entire screen (light characters on a dark background).

What does it provide? The 128 characters below: improved upper case and very readable lowercase with descending tails, all available to both Basic and machine language programs.



RAINBOW CERTIFICATION SEAL

Custom character sets are available as an option, call for a quote.

Compatibility: The LCA-47 is fully compatible with all TRS-80C software that we know of, including Color Scripsit. It has no effect on any semi-graphics or full-graphics modes. Also works great with Micro-Chroma-68 Kits and others using the 6847 VDG chip! The LCA-47 will not fit under the RF shield if Computerware's "16-plus" memory board is installed.

How to order: Send $75.00 plus $5.00 shipping in the U.S., $10.00 elsewhere, to:

Micro Technical Products, Inc.

814 W. Keating Ave., Dept. A
Mesa, AZ 85202

Arizona residents add $3.75 sales tax.

Phone: 602-839-8902
MC and VISA welcome.



GameMaster's Apprentice

By Bob Albrecht and George Firedrake
Rainbow Contributing Editors

The Mysterious and Unpredictable RND

If you roll an ordinary six-sided die, you get a random number from 1 to 6. Each possible number has the same chance, or *probability*, of occurring. If not...beware!...maybe the die is "loaded."



In CoCo programs, you use RND(6) to get a random number from 1 to 6. Hopfully, each possible number (1, 2, 3, 4, 5, or 6) has the same chance (probability) of occurring.

Suppose we roll a six-sided die 600 times. We expect to roll 1 about 100 times, 2 about 100 times, and so on. Instead of rolling an actual die, let's simulate it on the CoCo.

Here is a program to "roll" a six-sided die as many times as you ask. While it rolls merrily along, it counts how many times the die came up 1, 2, 3, 4, 5, or 6. When it finishes rolling, the CoCo tells you what happened.

```
100 REM ** RND EXPERIMENT #2
110 DIM COUNT(6)

200 REM ** TALK TO A PERSON
210 CLS
220 INPUT "HOW MANY RND NUMBERS"
; SAMPLESIZE

300 REM ** SET COUNTS TO ZERO
310 FOR K=1 TO 6
320   COUNT(K) = 0
330 NEXT K

400 REM ** COMPUTE RND NUMBERS,
COUNT OUTCOMES
410 FOR ROLL=1 TO SAMPLESIZE
420   NMBR = RND(6)
430   COUNT(NMBR) = COUNT(NMBR)
+ 1
440 NEXT ROLL

500 REM ** TELL WHAT HAPPENED
510 PRINT
520 PRINT "OUTCOME", "FREQENCY"
530 FOR K=1 TO 6
540   PRINT K, COUNT(K)
550 NEXT K

600 REM ** TELL HOW TO DO AGAIN
610 PRINT
620 PRINT "FOR NEW SAMPLE, PRESS
 ANY KEY"
630 IF INKEY$ = "" THEN 630 ELSE
 210
```

H I B presents

SOFTWARE FOR THE COLOR COMPUTER

TALK PROCESSOR 'I CAN TALK!'

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16K Ext. Basic $ 14.95

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RAINBOW CERTIFICATION SEAL

Enter the program and RUN it. First you see:

```
HOW MANY RND NUMBERS?■
```

Let's ask for a sample size of 600 rolls, We type 600 and press ENTER. Several seconds...then we see:

```
OUTCOME        FREQUENCY
   1             106
   2              97
   3             100
   4              96
   5              99
   6             102
FOR NEW SAMPLE, PRESS ANY KEY
```



Your Turn. Press any key and get another sample.

Last time, we asked you to write a program to compute and count outcomes for RND(N). Easy...make the following changes to RND EXPERIMENT NO. 2.

```
100 REM ** RND EXPERIMENT #3
110 DIM COUNT(12)

220 INPUT "FOR RND(N), WHAT IS N"; N
230 INPUT "HOW MANY RND NUMBERS";
SAMPLESIZE

310 FOR K=1 TO N

420 NMBR = RND(N)

530 FOR K=1 TO N
```

It begins like this.

```
FOR RND(N), WHAT IS N? ■
```

We want RND(3) numbers, so we type 3 and press ENTER.

```
FOR RND(N), WHAT IS N? 3
HOW MANY RND NUMBERS? ■
```

We ask for 1000 numbers. In a few seconds, the CoCo displays the results.

```
FOR RND(N), WHAT IS N? 3
HOW MANY RND NUMBERS? 1000
 OUTCOME        FREQUENCY
   1             337
   2             328
   3             335
FOR NEW SAMPLE, PRESS ANY KEY
```


STOP- THE MERZOID INVASION...
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Indianapolis, In 46220

The value of N cannot be more than 12. If you want to try a larger value, change the DIM statement in line 110. Don't be surprised, though, if you don't see all the outcomes on the screen.

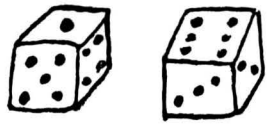
2D6

To same time and space (and rest our fingers) we will use the abbreviation D6 to mean one six-sided die.



D6

D6 means one six-sided die
1D6 means one six-sided die
2D6 means two six-sided dice
3D6 means three six-sided dice
and so on



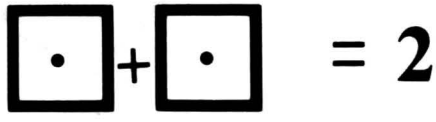
2D6

Roll 2D6 and add the spots. You get a random number from 2 to 12. No, you can't simulate 2D6 by using RND(12)!

RND(12) gives a random number from 1 to 12. Each possible number has the same chance of occurring as any other number.

That's not what happens when you roll 2D6. Some numbers are more likely to occur than other numbers. When you roll 2D6:

There is *one* way to get 2.



This is the basic principle of dice, and it is also the way that a number of games of chance are constructed. As you can see, there *is* only one way to get two when you are using two six-sided dice.

But, as the numbers change, that changes. Let's turn the page and look at the next example:

FULL SCREEN EDITOR

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- Master listing by diskette number with description
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This is the DIR command that you wish you had! Select only files starting with ? (1-8 char) or by ext type. Unique 64 x 68 line screen; Use the arrow keys to move your tv window thru SORTED directory list. Optional display to a printer.

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- Shows length of files
- Fast machine language
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There are two ways to get 3.





Your Turn

1 . . .

How many ways to get 4? 5? 6?...and so on. Write a program to do this work.

2 . . .

Write a program to roll 2D6 as many times as you want and tell how many times each possible number (2 to 12) occurred.

3 . . .

When you roll 2D6, what is the probability of getting 2? What is the probability of getting 3?...and so on. Make a table showing the probability of rolling each possible number (2 to 12). Use your CoCo to do this work.

Surely, but slowly, we will explore the following things:

★ The elusive RND

★ GameMaster's Dice

★ Looking up stuff in files. First, files of information in DATA statements and arrays. Next, cassette files. Eventually, disk files.

★ Whatever else comes to mind, or is suggested by you.

What do *you* want? If it fits into the general idea of "GameMaster's Apprentice," we might do it. Send your suggestions, complaints, kudos, requests, whatever...to George & Bob, P.O. Box 310, Menlo Park, CA 94025.

(Copyright ©1982 by DragonQuest, P.O. Box 310, Menlo Park, CA 94025. Portions of "The GameMaster's Apprentice" are from a book-in-progress called **Adventurer's Handbook: A Beginner's Guide To Role-Playing Games.)**

Look For The. . . .

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The Fine Print:
All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks

Chromasette Magazine P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066

Software Review...

TIMS Is A Fine Data Base Manager Program

Yes, I know, with all the computers around here, just why are we using an index card system to keep track of programs sent for evaluation?

I cannot tell you how many people around here want an answer to that question—and they are right. So, when *TIMS (Tape Information Management System)* arrived at *the Rainbow* the other day, we decided to kill two birds with one stone; do a review and get some things organized.

TIMS is designed to do the things a data base manager is supposed to do—keep track of things. It can keep track of your programs (what we use it for), keep an insurance record of valuable items, keep track of recipes, card lists and the like. Moreover, it will then sort out these items—using a very fast machine language sort technique—and will even search through a long list of items to find what you want. All of this is done in memory, so these processes—enhanced by the machine language routines—are very quick.

Of course, there is a drawback to this system—that of available memory. *TIMS* will work with a 16K system, but 32K is recommended. And, once you run out of memory, your single file will not hold any more entries. You can, however, create more files easily.

TIMS combats this problem of memory use in a unique way. It reads the length of your files and configures itself so that it gets the best use of your memory. In other words, if your entries are short, you can get more of them in. This is accomplished every time you read a file in from tape. To our mind, this is one of the best features of the system.

Other good features are the ease of entry and the very simple way in which *TIMS* allows you to change entries in which you either made a mistake or need to update. In fact, we actually were making data entries into the system within 10 minutes after loading the tape. It's that easy.

We also like the screen displays, which use a little low resolution color to highlight the screens. These do not do anything to the program *per se* except making it easy on the eyes. Since data entry can be tedious, they are appreciated.

TIMS is not everything to everyone. For instance, tape *is* much slower than is disk and the necessity to read in every piece of data does make for limitations on the length of files.

Those things aside (which no one can solve with a tape-based system) we like *TIMS* very much. It has some other features, too, such as an automatic double-save of data files (to prevent possible problems), the ability to sort on second and third fields (all the Smith's will be sorted by first name as well) and two kinds of searches—ranges and items. In this last, you will be able to find all the recipes which use, say, Jello, or you can go directly to "Jello Delight."

We have no qualms in recommending *TIMS*.

(Sugar Software, 2153 Leah Lane, Reynoldsburg, OH 43068, $24.95)

Look For The. . . . .

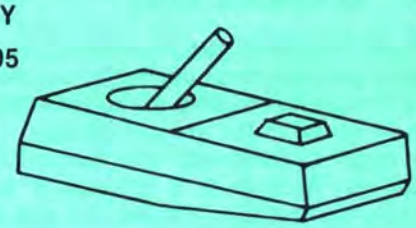
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presents:

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RAINBOW REVIEWED OCT. 1982

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*VIKING (Go from landowner to King!)	~~$19.95~~	$16.95
*GANGBUSTERS (Lead a life of crime and win!)	~~$19.95~~	$16.95
*FANTASY GAMER'S PACKAGE(16K) (Generates dungeons, characters, and monsters and includes sample module)	~~$19.95~~	$16.95
PANDORA'S GAME BOX (Includes: "pac" game, "defender-type" game, Divebomb, Blockade, slot machine, and Squares (similar to cube))	~~$24.95~~	$21.20
*PREREAD I, II, & III (Three tapes prepare your preschooler to learn to read)	~~$24.95~~	$21.20

TOM MIX SOFTWARE:

KATERPILLAR ATTACK (New!)	$24.95
SNAK PAK (Best "PAC" version yet!)	$24.95
*SHIP WRECK (Great adventure!)	$14.95
WAR KINGS (Two player action)	$19.95
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MARK DATA PRODUCTS:

BERSERK (Just like arcade!)	$24.95
BLACK SANCTUM (Excellent adventure!)	$19.95

COLORSOFT:

*MATH DERBY (Fun while learning!)	$11.95
*STOCK ANALYZER (Investment tool!)	$16.95

*Requires 16K Ext. Basic minimum - others 16K Std. Basic minimum.

★ ★ ★ **32 Korner** ★ ★ ★

TOM MIX's PROTECTORS (Brand new Defender type) (So good it had to go to 32K)		$24.95
PRICKLY-PEAR'S 32K FANTASY GAMER'S PACKAGE (Like 16K version, but much more!)	~~$24.95~~	$21.20

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Game...

Towers of Hanoi is a Game For You Thinkers

16K ECB

By Robert A. Kelley

Towers of Hanoi is a classic puzzle involving the transfer of progressively larger disks from one peg to another, using a third peg as a temporary holding place. Instructions are simple and can be found in the program listing.

Some of you might be interested in its name. *Towers of Hanoi* is called that because it is believed it was first developed by the ancient elders of Indochina as a study in logic. Whatever the source, it is an interesting game which is fun to play and difficult to solve.

The program was written for 16K but is readily adaptable to a 4K CoCo using standard condensing techniques (delete REMs, shorten the variable names, etc.) There is a neat solution to the problem which requires the application of a regressive mathematical function, but the fun comes in discovering the solution during play.

VARIABLES
PEG$(3, 8) current status of each peg
DISK$(8) individual disks
MV move number
A$, B$, C$ peg bases
FLAG end-of-game indicator
MSG$ illegal move message
BL$ blank line
FR$ peg from which disk is to be moved
OB$ peg to which disk is to be moved
F smallest disk position on FR$ peg
O last empty position on object peg
TP length of disk to be placed on object peg
BOTTOM length of disk on object peg

```
10 'TOWERS OF HANOI
20 'WRITTEN FOR 80-C BY:
30 'ROBERT KELLEY
40 '59 S. PIONEER AVENUE
50 'TRUCKSVILLE, PA 18708
60 GOSUB 830
70 CLEAR:CLEAR 750:CLS0
80 DIM PEG$(3,8),DISK(8)
90 BL$=STRING$(9,128)
100 MV=1
110 A$="====1===="
120 B$="====2===="
130 C$="====3===="
140 'BUILD COLORED DISKS
150 DISK$(1)=CHR$(133)+CHR$(143)
    +CHR$(138)
160 FOR X=1TO3:DISK$(2)=DISK$(2)
    +CHR$(159):NEXT
170 DISK$(3)=CHR$(165):
    FORX=1TO3:
    DISK$(3)=DISK$(3)+CHR$(175):
    NEXT:
    DISK$(3)=DISK$(3)+CHR$(170)
180 FOR X=1TO5:DISK$(4)=DISK$(4)
    +CHR$(191):NEXT
190 DISK$(5)=CHR$(197):
    FORX=1TO5:
    DISK$(5)=DISK$(5)+CHR$(207):
    NEXT:
    DISK$(5)=DISK$(5)+CHR$(202)
200 FORX=1TO7:DISK$(6)=DISK$(6)+
    CHR$(223):NEXT
210 DISK$(7)=CHR$(229):
    FORX=1TO7:
    DISK$(7)=DISK$(7)+CHR$(239):
    NEXT:
    DISK$(7)=DISK$(7)+CHR$(234)
220 FORX=1TO9:DISK$(8)=DISK$(8)+
    CHR$(255):NEXT
230 FOR X=1TO8:
    PEG$(1,X)=DISK$(X):NEXTX
240 'DISPLAY CURRENT STATUS
250 IF PEG$(3,1)<>"" THEN FLAG=1
260 CLS0:PRINT@260,A$;:
    PRINT@276,B$;:PRINT@460,C$;
270 FOR X=1TO8:
    PRINT@(32*(X-1)+8)-
    INT(LEN(PEG$(1,X))/2),
    PEG$(1,X);:NEXT
280 FOR X=1TO8:
    PRINT@(32*(X-1)+24)-
    INT(LEN(PEG$(2,X))/2),
    PEG$(2,X);:NEXT
290 FOR X=1TO8:
    PRINT@192+(32*(X-1)+16)-
    INT(LEN(PEG$(3,X))/2),
    PEG$(3,X);:NEXT
```


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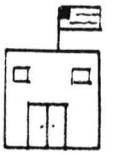
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```
300 IF FLAG=1 THEN END
310 'DISPLAY PROMPTS
320 PRINT@320,"MOVE #";:
    PRINT@326,MV;
330 PRINT@342,MSG$;:IF MSG$<>""
    THEN MSG$="NO MOVE":
    SOUND 10,10
340 PRINT@352,"FROM  ";
350 PRINT@374,MSG$;
360 PRINT@386,"TO ";
370 IF MSG$=""THEN 400
380 FOR X=1 TO 1000:NEXT
390 PRINT@342,BL$;:
    PRINT@374,BL$;
400 MSG$=""
410 IF MV=1 THEN 420:
    FOR X=1 TO 1000:NEXT
420 PRINT@359,CHR$(143);:
    FOR X=1TO75:NEXT:
    PRINT@359,CHR$(128);:
    FOR X=1TO50:NEXT
430 FR$=INKEY$:IF FR$="" THEN
    420 ELSE PRINT@359,FR$;
440 PRINT@391,CHR$(143);:
    FORX=1TO75:NEXT:PRINT@391,
    CHR$(128);:FORX=1TO50:NEXT
450 OB$=INKEY$:IF OB$=""
    THEN440 ELSE PRINT@391,OB$;
460 GOSUB 490
470 GOSUB 770
480 GOTO240
490 'SOURCE & OBJECT PEG TESTS
500 OB=VAL(OB$):FR=VAL(FR$)
510 OB=INT(OB): FR=INT(FR)
520 IF OB<1 OR OB>3 THEN 750
530 IF FR<1 OR FR>3 THEN 750
540 IF OB=FR THEN 750
550 IFPEG$(FR,8)="" THEN 750
560 FOR X=1TO8
570 IF PEG$(FR,X)<>"" THEN F=X
    :GOTO 590
580 NEXT X
590 FOR X=1TO8
600 IF PEG$(OB,X)<>"" THEN
    O=X-1:GOTO 690
610 NEXT
620 O=8
630 IFPEG$(OB,8)="" THEN 690
640 FOR X=1TO8:IF PEG$(FR,F)=
    DISK$(X) THEN 660
650 NEXT
660 FOR T=1TO8:IF PEG$(OB,O+1)=
    DISK$(T) THEN 680
670 NEXT
680 IF X>XX THEN 750
690 'TEST FOR LARGE ON SMALL
700 IF PEG$(OB,8)="" THEN 740
710 TP=ASC(PEG$(FR,F))
720 BOTTOM=ASC(PEG$(OB,O+1))
730 IF TP>BOTTOM THEN 750
740 RETURN
750 MSG$="ILLEGAL!!"
760 GOTO260
770 'MOVE PIECE
780 PEG$(OB,O)=PEG$(FR,F)
790 PEG$(FR,F)=""
800 MV=MV+1
810 O=0
820 RETURN
830 'INSTRUCTIONS
840 CLS:PRINT TAB(9) "TOWERS OF
HANOI"
850 PRINT:PRINT"THIS IS A CLASSI
C GAME,SAID TO  HAVE BEEN ORIGIN
ATED BY HOLY MENIN THE FAR EAST.
"
860 PRINT"THE OBJECT IS TO TRANS
FER ALL OFTHE COLORED DISKS FROM
 PEG#1 TO PEG#3. ONLY ONE DISK M
AY BE"
870 PRINT"MOVED AT A TIME, AND A
T NO TIME MAY A LARGER DISK BE P
LACED ON  A SMALLER DISK."
880 PRINT:PRINT"THE TASK CAN BE
ACCOMPLIHED IN  NO FEWER THAN 25
5 MOVES."
890 PRINT:LINE INPUT"HIT <ENTER>
 TO CONTINUE";EN$
900 RETURN
```


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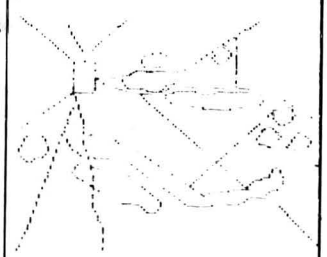
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Protect Your Screen From The Ravages Of Scrolling With This Machine Language Scroll Protection Utility



By Charles J. Roslund
***Rainbow* Contributing Editor**

(Mr. Roslund is the author of ***War Kings***, ***Intergalactic Force*** *and many machine language utilities for the 80C.)*

This month I will provide you with a short machine language program that will enable you to protect any number of lines at the top of your *text* screen from automatically scrolling off the screen when the rest of the screen scrolls under basic's control. This feature could have all sorts of uses. Some typical examples that come to my mind are:

1. Column headings that you want to remain on the screen while you print pages of data.

2. The top few lines in an adventure game that may describe the room you are in. This information could be left on the screen while you respond to the adventurer's questions about the room.

This scroll protect routine will protect as many lines as desired from automatically scrolling off the screen when Basic's automatic scrolling occurs (for example, when a carriage return is printed on the bottom screen line). You may print on the protected screen lines by first executing a *CLS* instruction, which works as usual, or using a *PRINT* @ command.

```
0001 0E00                      NAM SCROLP
0002 0E00                      ORG $0E00
0003 0E00 BE0168   START  LDX $0168       RAM HOOK FOR OUTCHR
0004 0E03 AF8C0C          STX <OLDVEC,PCR SAVE OLD VECTOR
0005 0E06 308C0C          LEAX <NEWVEC,PCR
0006 0E09 BF0168          STX $0168       INSTALL NEW VECTOR
0007 0E0C 8639            LDA #$39        # PUT RTS AT START,
0008 0E0E A78CEF          STA START,PCR   # FOR SAFETY'S SAKE
0009 0E11 39              RTS
0010 0E12 5555     OLDVEC FDB $5555       OLD VECTOR SAVE LOCATION
0011 0E14 02       NUMLIN FCB $02         NUMBER OF PROTECTED LINES
0012 0E15 3417     NEWVEC PSHS A,B,X,CC   SAVE REGISTERS
0013 0E17 0D6F            TST <$6F        OUTPUT UNIT (0=SCREEN)
0014 0E19 2610            BNE RETURN      IF NOT SCREEN, RETURN
0015 0E1B 9E88            LDX <$88        CURSOR LOCATION
0016 0E1D 8C05E0          CMPX #$05E0     ON LAST LINE?
0017 0E20 2D09            BLT RETURN      NO, RETURN
0018 0E22 810D            CMPA #$0D       <CR> ?
0019 0E24 270A            BEQ SCROLL      YES, GO SCROLL
0020 0E26 8C05FF          CMPX #$05FF     AT END OF SCREEN?
0021 0E29 2705            BEQ SCROLL      YES, GO SCROLL
0022 0E2B 3517     RETURN PULS A,B,X,CC   RESTORE REGISTERS
0023 0E2D 6E9CE2          JMP [OLDVEC,PCR] RETURN TO OLD VECTOR
0024 0E30 A68CE1   SCROLL LDA NUMLIN,PCR  # OF PROTECTED LINES
0025 0E33 C620            LDB #32         CHARACTERS / LINE
0026 0E35 3D              MUL             # COMPUTE SCREEN START
0027 0E36 C30400          ADDD #$0400     #   FOR SCROLL
0028 0E39 308C09          LEAX <RET,PCR   RETURN ADDRESS
0029 0E3C 3410            PSHS X          PUT ON STACK
0030 0E3E 1F01            TFR D,X         X=SCREEN START
0031 0E40 3416            PSHS A,B,X      PUSH REGISTERS SCROLL WILL PULL
0032 0E42 7EA34E          JMP $A34E       CALL SCROLL IN ROM
0033 0E45 0A89     RET    DEC <$89        DECREMENT CURSOR POINTER
0034 0E47 20E2            BRA RETURN
0035 0E49                 END START
```

To activate *SCROLL PROTECT*, you need only load the program (listing accompanying this article) and *EXEC*ute it. *SCROLL PROTECT* is written in position independent code so it may be located in any convenient RAM area. You must reserve the area of memory where *SCROLL PROTECT* is located (with a *CLEAR* command if you choose to locate it high in memory) and not use that area of RAM again until you cold start the computer. A cold start may be accomplished by turning the computer off and on, or by entering the command POKE&H71,0 and then pushing the RESET button on the back of the compter.

The location labeled NUMLIN is where you may put the number of lines you wish to protect. I have reserved two lines in this listing. To protect four lines from scrolling you would POKE&H0E14,4, if you locate the program at the same address as the attached listing. If you poke a zero in NUMLIN, no lines will be scroll protected. You may change NUMLIN even after *SCROLL PROTECT* has been executed and the number of protected lines will immediately change. Do not poke a value greater than 15 into NUMLIN (since there are only 16 screen lines).

Following is a description of how *SCROLL PROTECT* works:

Lines 3 through 9, beginning at the label START, perform initialization. Location $0168 contains a vector (RAM HOOK) that is vectored through every time a character is printed to any device (screen, printer, cassette, disk, etc.). The beginning address of the actual *SCROLL*

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PROTECT routine, labeled NEWVEC, is placed in this vector location so that the program beginning at NEWVEC will be executed every time a character is printed. The original vector at $0168 is saved to return to when *SCROLL PROTECT* has completed its job. The last task the initialization routine does is put an RTS instruction ($39) at the START. This protects against performing the initialization more than once, if you attempt to *EXEC*ute the program more than once.

The label NEWVEC starts the routine that actually does the Scroll Protection. First it saves some registers that should be preserved. It then tests address $006F and returns if it does not contain a zero. $006F contains the OUTPUT UNIT number, which is zero if you are printing to the screen (-2 for the printer, etc.). Next, at line 15, it loads the X register from address $0088. This is a pointer to where the cursor currently is on the screen. Screen memory runs from $0400 to $ 05FF, so if this pointer is less than $05E0, the cursor is not yet on the bottom screen line. Line 16 checks for this condition, and returns if the cursor is not on the bottom line. If the cursor is on the bottom line, a CMPA #$0D is executed. The A register contains the character that is to be printed, and $0D in ASCII is a carriage return. If you were going to print a carriage return on the bottom screen line, the program branches to SCROLL. SCROLL calculates the starting address to scroll the screen down from in lines 24 through 27. The next two lines (28 and 29) push a return address onto the stack. The starting address for scrolling is then transferred from register D to X, and then in line 31, registers A, B, and X are pushed onto the stack. These last steps (lines 28 through 31) are necessary because I will call the scroll routine in ROM at line 32. The point where I enter the scroll routine assumes the X register contains the screen start address. By loading X with a number other than $0400, I was able to tell the ROM scroll routine where to start from. The ROM scroll routine ends with a PULS A, B, X, PC instruction. I had to PUSH these registers onto the stack before calling the scroll in ROM returns (to RET), I decrement the cursor pointer (least significant byte) by one to point it to the correct screen location and then branch to RETURN. RETURN PULL's the registers that were saved at NEWVEC, and jumps to the original RAM hook vector that was saved at OLDVEC. At this point, Basic is finally allowed to print the character it had in the A register.

The other path through *SCROLL PROTECT* executes lines 20 and 21 which check if you are printing a character at the very end of the screen ($05FF). If you are, SCROLL is called, and the same steps described above are executed.

If you have *MINIMON* running from last month's column, you can get *SCROLL PROTECT* into memory with the "S" command. To locate *SCROLL PROTECT* where my listing shows, load and execute *MINIMON*. Then enter the command "S 0E00 *ENTER*, and start entering the numbers in the third column of the source listing. Every two digits must be followed by a *return*.

When you are done, exit the monitor with a "G" command and save a copy of *SCROLL PROTECT* to tape or disk. The start, end, exec addresses for where the listing shows the program located are $0E00, $0E48, $0E00. These addresses locate *SCROLL PROTECT* in the first Disk Basic, or the second Extended Basic, Graphics page. This is a convenient location if you are not using these grapics pages.

This listing is applicable to Extended Basic or Disk Basic computers. If you have regular Color Basic, you must change the jump at line 23 to an RTS instruction. This is most easily done by changing all three bytes of object code on line 23 (6E, 9C, E2) to (39, 39, 39).

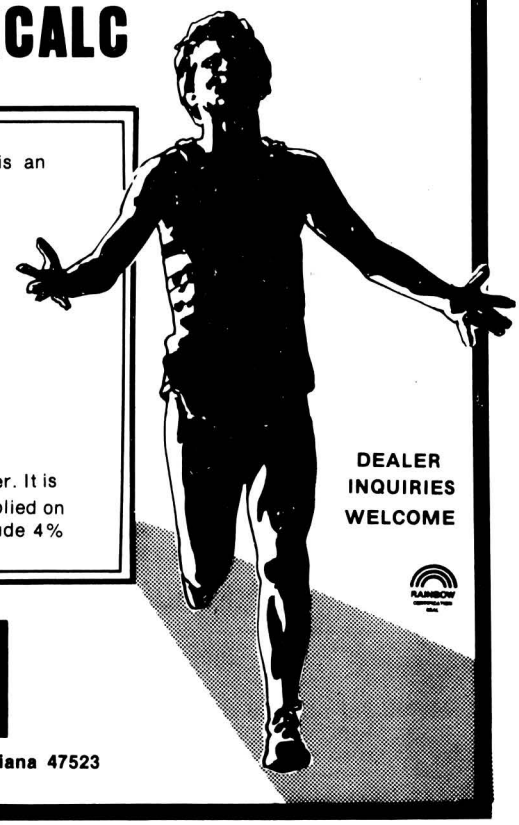
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Software Review...

PAC-DROIDS Packs Plenty Of Arcade Challenge

Who was it who said, "You can't tell a book by its cover...?" Shakespeare? The shorter Bartlett? And, isn't there a second line, or more? Well, adage or not, I've never really subscribed to that bit of philosophy, anyway. I make all sorts of decisions based on covers, books and what have you. So, when Pac-Droids came to me in a spiffy box with a colorful cover, I decided it was going to be better than your average bear.

Then, 34 seconds after I popped the cassette into the recorder, came the first segments of the title page, sort of the "video cover." With computer games, I've found title pages to be extra special; usually, they're brilliant in color, painstakingly detailed and lovingly produced. I figure that sometime in the next century, some art critic will build his reputation on being the expert on early personal computer title page art. People viewing his collection will ooh and ah and exclaim how, "They just don't make computer art like that anymore."

The Pac-Droids title page is something of a tease. It appears behind a screen of green lines that peel off, one by one, from the top until there it is in all its glory. As I watched the lines wipe away to one side, I wondered: "Is the entire title page behind the screen all the time as the lines peel off, or is it actually created, line by line, as the green lines scoot off the screen?" I guess we'll have to defer to Charles Forsythe, who created the game for The Programmer's Guild, for the answer to that. Anyway, it was a very interesting process that kept me occupied until, at the 1:45 minute mark, the maze game was fully loaded and ready to play.

If the name didn't tip you off, let me spoonfeed you with the information that this is the latest—and, thus far, greatest—in the series of home computer Pac-Man derivatives. And, if Mr. Forsythe doesn't find my use of the term "derivative" in good taste, well...sorry, Charlie.

I mean, you start out in the middle of this maze, and the idea is to stay away from the three drones while you eat up some dots. If the drones get too close for comfort, you head your space ship toward one of the energy pellets in each of the corners and get a transfusion. Then, for a few fleeting seconds you are surrounded by an energy field and can ram the red drones for extra points.

Of course, the drones take off like the proverbial bat when you get energized. Eat all the dots without getting dispatched and you're on your way to the 10,000 post mark where you get an extra ship and a new maze pattern. Sound slightly familiar? Bet a roll of quarters on it. But Pac-Droids has some new twists on the chase/get chased plot, and they add a lot to the excitement.

To begin with, there's a drone hot on your heels from the moment you leave the starting gate. No more solitary grazing at the bottom of the screen. And beware the dreaded Blue Drone Robot! You don't tangle with him (her?) even if you've just had energy dot spinach. Not only that, the Blue Drone Robot also plants mines that look a lot like energy dots. But then, you have Super Bomb! By careful navigating, you can drop one of your supply of three Super Bombs at just the right time and destroy everything in its path—mines, red drones, even the Blue Drone Robot. Balooey!

Pac-Droids can be played with joysticks or the keyboard arrows, and up to four players can compete in one game. It works on all 16K Extended Basic CoCos and is in machine language for fastest action.

A feature I liked especially—and one the arcade game

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by Mark Zimmerman and Ed Pollard

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could use, too—is a combination audio/video signal that shows how much time the next player has to get ready for action. A bar of colored lines reaches across the top of the screen as the between-player interval begins. The bar gets shorter and shorter to the accompaniment of a dropping-bomb sound until the action picks up again. The bomb-dropping sound is a clever audio alarm that can catch the attention of next-up players who may have their eyes off the screen.

Personally, I found the keyboard arrows more effective in controlling the action than the joysticks, but a companion had just the opposite experience. Neither of us came even close to the 10,000 points needed for a new maze screen, but it was our first encounter, and the potential was clearly there. There's definitely enough challenge in Pac-Droids to last a long, long time, and I'm going to make at least 10,000 even if I have to draw a pattern to it—as was the case with the arcade game.

Maybe I shouldn't admit this in print, but Pac-Droids does underline a problem I have with joysticks: I can never remember which way is up! Now, my particular problem is compounded by having several brands of joysticks to choose from, an embarrassment of riches I suppose, but none of them have a label saying top, bottom, up or down. On some joysticks the fire button is above the stick, on others, below, on others, on the side. Yes, I could label them myself, but, in case any innovative manufacturers are listening...hear this, I'll bet I'm not the only soul out here in consumerland who wastes the first play of every graphics game just getting oriented to my joystick.

A final word of caution to novices, while Pac-Droids packs plenty of challenge, even for the joystick-jaded, if you aren't "into" the maze genre of consumer graphics games, have patience and keep playing. This reviewer has pumped more quarters than he cares to calculate into Pac-Man coin slots, and he went through easily two dozen Pac-Droids games before he felt like he had any control at all. The payoff on your initial frustration in learning comes in having a game that will put your skill to the test long after you've become a veteran computer combatant.

(The Programmer's Guild, P.O. Box 66, Peterborough, NH 03458, $19.95)

—Jim Reed

Software Review...

El Diablero Will Test Your Adventure Skills

If you are a novice adventurer, you best stay in the farm leagues for a while before tackling *El Diablero*.

This new Adventure program requires something more than a minimum amount of skill to solve. As the advertising says, you start out alone in the middle of a desert. And, frankly, that is a real accurate description of where you are. You know what there is in the middle of the desert, don't you? Virtually nothing, that's what. And that's how you start *El Diablero*.

Things do not get better quickly. To make it somewhat easier, though, you have an advanced movement feature—pressing arrow keys to go north, south, east and west. No having to type in "Go North" or, even, "N." All that is necessary is to press one of the arrow keys (except for the left arrow—because it continues to be the means to "erase" text entry. So, the next key—the @ sign—is substituted.

Don't let this easy movement lull you. That is the only thing that *is* easy about *El Diablero*. It's an interesting and complicated Adventure, with magic combined with the

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other usual things to make for an exciting but challenging game.

If you are into Adventures, *El Diablero* offers some unique challenges. We believe you will like it.

(Computerware, Box 688, Encinitas, CA 92024, $19.95 tape, $24.95 disk)

Software Review...

Five Defender Games Offer Variety And Thrills

By Robert D. Nunziato Jr.

(All of a sudden, there are more "Defender-like" games on the market than there are snatchers in the sky. We asked Mr. Nunziato to review the ones we had on hand a couple of weeks ago, but then two more came in. In order to make this a comprehensive assessment of these games, we are combining his reviews of three programs, followed by two of ours—done by our own staff.)

This has been a lot of fun—the opportunity to be a space jockey, flying and fighting my way through three new "Defender-type" games.

The first, *Offenders*, comes pretty close to the arcade version. The program introduction unwinds with high resolution and rainbow colored graphics complimented by 21st Century sound effects. The game itself continues to produce impressive high res "rainbow" graphics which scroll smoothly during play.

The scenario, though described as a mideast conflict in the documentation, parallels the arcade space game. You use your joystick to control your ship's direction, speed, altitude and rocket fire as you cruise above the surface destroying (or being destroyed) by a variety of alien "things."

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Scattered along the moving terrain below are your ground compatriots. Alien snatchers move down to grab your guys and move them up. Score bonus points if you can destroy the snatcher, scoop up your guy in midair and fly him safely to the ground. No easy feat! It the snatcher makes it to the top—look out!

As you zoom around zapping the enemy, keep one eye on the scanner screen. It keeps you posted on the enemy's location and highlights a "snatch" in progress. There are a couple of other good twists to this arcade action that I will leave for you to discover.

Its in machine language for 16K.

The second of the trio, *Starfire* incorporates the same features and general play rules. There are, however, a few added options; warp drive and a smart bomb. Watch out for the alien space ship in this one! It comes after you like a homing pigeon to the roost.

The graphics are high res and excellent, but "break up" when graphic characters overlap. The sound is fair, colors good. Control of your ship is handled through the keyboard and ship movements are quick. Keyboard control takes some getting used to but is *not* a drawback.

There is some difficulty in placing enemy craft in relation to your ship on the scanner. Sometimes you can't pick yourself out of a crowd. *Starfire* is generally not as impressive as *Offenders*, but it represents a quality machine language, arcade-type game for the 16K 80C with a few play features that *Offenders* lacks.

The third entry, *Avenger*, lacks some of the sophisticated features provided by *Offenders* and *Starfire*. In this game, the graphics are high res and excellent, the scrolling smooth but the colors—green on black—are not impressive. The scanner provides a clear picture and is the best of the three. Control of the ship is again by the keyboard, providing upward, downward and variable speed unidirectionally.

This drastically reduced playability. There are no men on the hills below and no snatchers in the skys. Yet, there is no shortage of attacking alien ships and devices.

All in all, this 16K machine language program is a straightforward "shoot-'em-up game.

Protectors provides the most colorful graphics of the group. It, too, is in machine language but uses 32K and makes you a two-handed pilot. Yes, you need both joysticks to make it do its stuff. This is somewhat difficult, but you can either get the "hang" of it or just forget about the left joystick—which, primarily, controls the direction your laser beam fires.

There is no scanner screen, but there are mines. They can give you fits—as they track your ship. There is a smart bomb available, too, that can be released by pressing both joysticks. And, handy for those needed respites, there is a "freeze action" option that stops everything while you take a breather . . . or answer the telephone.

Last, but certainly not least, is *Planet Invasion*. It has fine high res graphics, good sound, a well-done scanner, lots of different attackers, snatchers and smart bombs. You can catch your own men after you have destroyed the snatchers and you can also flash into hyperspace.

An additional feature of *Planet Invasion* is that you can earn bonus ships and smart bombs. And, you have variable speed in flying in both directions.

Another neat feature is what happens to you if all your "crystals" are snatched away. *Planet Invasion* sends you into the depths of space to fight until you kill enough nasties to get back to the surface.

This one uses one joystick, but also two keys on the keyboard for launching your smartbomb or to move into

hyperspace.

(*Offenders,* American Small Business Computers, 118 South Mill, Pryor, OK $29.95 tape, $34.95 disk)

***Starfire*, Intelletronics, 22 Churchill Lane, Smithtown, NY 11787,$21.95)**

(*Avenger,* The Cornsoft Group, 6008 N. Keystone Ave., Indianapolis, IN 46220, $19.95 plus $1.50 s/h)

(*Protectors,* Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, $24.95 tape, $27.95 disk plus $1 s/h)

***Planet Invasion*, Spectral Associates, 141 Harvard, Tacoma, WA 98466, $21.95 plus 3% s/h)**

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Hardware Review...

Video Interface Kit Is A Boon For Colors

Even if you sink a lot of money into a color TV, you are still at the mercy of the little silver box inside CoCo's innards which converts the "raw" video output to something that can be used with a regular TV.

There are products on the market known as monitors which have better line-scanning capabilities than a regular TV. These are the kind of sets that you will see in a television station. But they have to be —for the most part—hard-wired in. In other words, a monitor does not also have a tuner built in.

With a computer, this can be a boon. That is simply because there is no chance of a regular TV station interferring with your 80C's signals. At the same time, though, you cannot use a monitor as a regular TV.

Still and all, a color monitor will greatly improve your picture from CoCo. There is one additional problem, though. And that is that most monitors will not hook up with the signal (called RF video) which comes out of the back of the 80C.

But, if you are going to the expense of buying a monitor, you don't want the RF signal, anyway. You want something called *composite video.*

Radio Shack did the smart thing in supplying RF video. It meant that any TV could be used with CoCo. But, for those who want a little more, you have to bypass the RF video and get the "raw," or composite, video signal.

Enter the Video Interface Kit. This is a little gizmo that has to be soldered into the inside of the 80C (thus voiding your warranty when you open the case) and, in effect, bypassing the box which converts the composite signal to an RF signal. If you have a monitor which will only accept composite video, this is a nice way to go.

The kit is easy to install and works well. There is no question that the combination of a kit and a monitor greatly improves the color and resolution of the picture from your 80C. There are only five points which have to be soldered—and they are fairly simple to do.

Our only complaint with the Video Interface Kit is with the instructions. While the written ones are complete, the diagram is backwards as to orientation of the computer. The written instructions say to turn the computer so you are facing the back—but the diagram shows the innards as facing from the front.

A nice bonus with the kit is an output for audio as well as video. While few monitors come equipped with audio (ours does), having true audio output is a bonus.

(Jarb Software, 1169 Florida Street, Imperial Beach, FL 92032, $19.95)

Software Review...

Here Are 200 Tunes For CoCo To Play

If you want CoCo to play for you, then there is a way. *The Songbook* offers more than 200 tunes ranging from childhood to Christmas numbers that are easy to play and fun to listen to.

We have worked with several songs, and have had a moderate amount of success. Except for one or two places in all 200-plus of these tunes, Sara Nolen has done an excellent job of using the PLAY command to give you some of America's best-loved songs.

This is really a two-part package. One part is the songbook itself, with the words and CoCo PLAY command "scores" of all the music. The other is a tape or disk version of the songs—run from a series of menus—which allow you to hear all of them without typing them in.

The *Songbook* programs have a modified version of a menu which allows you to enter the number of the song you wish to have played. CoCo then displays the song's title on the screen and plays the song. Once it ends, you can choose another...and another...and another.

This is a four-program package, with each containing about 50 songs. For tape users, each tape must be loaded separately to gain access to the songs in that particular program. For disk users, there is a menu to load the particular program you want, and then select the song. Its fast.

And the songs: A fine selection, all told. There is a large number of Christmas tunes, children's songs, many old favorites, a few waltzes, folk songs and patriotic songs. Why, you could even get married with the *Songbook*; it includes two wedding marches. Or graduate. "Pomp and Circumstance" is here, too.

This one is a lot of fun.

(Prickly-Pear Software, 9822 E. Stella Road, Tucson, AZ 85730, $29.95 on tape, $34.95 disk plus $2 s/h)

Software Review...

Big Num Will Give You Lots Of Big Numbers

For those who are fascinated by big numbers—billions, trillions, sextillions and more—then *Big Num* may be for you.

As you know, CoCo can show up to nine digits before it goes to exponential display. After those nine digits, you will get a number like 1.23456789E+09 to indicate you should move the decimal point nine places right and add zeroes if

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necessary. This can be confusing.

Big Num solves this problem by using some of the machine language registers to give you true big numbers. The number above would be shown as 1234567890. Moreover, it can perform addition, subtraction, multiplication, division or exponential factoring (raising numbers to powers like 99^{99}) and give true answers.

This is accomplished by using the registers of the 80C and takes a few minutes to get used to. And, although you are using machine language subroutines, some of the calculations (particularly with exponents) take some time.

But you do get big numbers—and we mean big ones. If you use or need big numbers—or just want to play around with them, then *Big Num* is just the ticket for doing so.

Incidentally, *Big Num* is also accurate to all of its digits (1,024 in 16K, more with larger memory capacity), although it does not have commas to separate the "sets" of numbers.

For those who want to play around with numbers, or who need the true and accurate numbers, *Big Num*—while a bit expensive—will perform as described and do it well.

(Quasar Animations, 1520 Pacific Beach Drive, San Diego, CA 92109, $19.95))

Software Review...

Dungeon Maze Game Has Interesting Graphics

When you find a game which combines both graphics and "words" in an Adventure, you expect to really have a lot of fun. And, that is pretty much the case with *Dungeon Maze Game*.

This is a somewhat difficult adventure and, frankly, the switching of the graphics and text screens (you have to do it by entering a single key) gives added enjoyment. The Adventure itself is enjoyable, pretty darn difficult and has a good premise which will keep your attention.

The graphics part of this game is a maze which is viewed from above. Its done with simple lines and a "little person" (you) to show location. By pressing a single key you can switch to the text screen for a description of where you are—and a warning tone sounds when you near a "magic" area.

Movement on the graphics screen is accomplished by using the arrow keys, so that is a simple process which does not interfere with the game play. What does, however, is the use of Basic to re-draw the maze with each move. This, frankly, is the major negative to the program—it takes a few seconds to make each move. If you assume that you are a thoughtful Adventurer, then there is little problem with this moving time, but, if you want to go fast, it can be somewhat distracting.

Overall, *Dungeon Maze Game* rates pretty high on the Adventure scale, both in terms of difficulty and in terms of playability. While it was initially distracting to change screens to find out where you were, we quickly got used to the style of play and found it much more fun to "see" locations as we moved than to just imagine them.

A word should be said for the top-view of the maze. For many reasons we liked it better than the traditional "inside" view of a maze. Perhaps it was because it was easier to visualize the place we were from above than from ground level.

(Circle City Software, P.O. Box 30166, Indianapolis, IN 46220, $27.95 tape or disk)

Software Review...

Roman Checkers Is A Clever Othello

Roman who? I had never heard of this game which Radio Shack calls *Roman Checkers*. Don't let the name fool you. *Roman Checkers* is Radio Shack's version of the popular board game, *Othello*.

This RS product is a surprisingly clever rendition of the board game which uses "reversible discs." The computerized version displays the board pieces in the form of "Eagles" and "Monuments." But the idea is the same. The goal is to maneuver opponent's pieces. By successfully executing this maneuver, the opponent's pieces become your pieces. The rules of play can be mastered in a few minutes. The strategy of play may take you years to attain true mastery. It's a fun game, though.

Your opponent may either be another person—in which case, the computer acts as score keeper—or the computer itself. The computer allows you to select various levels of difficulty. If you are stumped by a particular move, ask the computer to display your possible legal moves. You may even request guidance in making the "best" move for a given board setup.

As you become a better strategist, your games may last for hours. Radio Shack has included a provision for saving the current board setup and score on cassette. Get a good night's sleep and come back to it later!

Roman Checkers is supplied in a ROM pack.

(Available at Radio Shack stores for $29.95)

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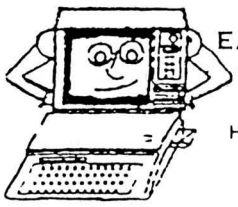
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Software Review...

Not a Monster But Pretty Big League

By Ted Lee
Kentucky Country Day School

This is a review of the software cassette program *20,000 Leagues Under the Sea* from the Reading Is Fun Series for the Radio Shack Color Computer.

This package includes a reading book with illustrated pictures, a cassette audio tape that reads aloud each word in the book, and one cassette tape (two sided) which contains both spelling and vocabulary programs to drill and/or test the listener on these areas.

There are essentially two parts to this package. The audio cassette tape with its accompanying reading book is one part. The cassette tape containing the vocabulary and spelling drills is the second.

In this reviewer's opinion, the audio tape and illustrated book are excellent. The voices narrating the story, word for word, seem to be those of professional actors, providing tone and emotion to the words. There is also some musical accompanyment which adds to the zest of the story. All in all I think almost everyone loves to hear a good tale told with rousing spirit. The combination of this high-quality aural dramatization and adequate art work should make the reading of this condensed booklet a pleasure for almost anyone. In fact, I suspect that this part was done separately, and Radio Shack adapted it and combined it with the computer.

Although the drills are well done and have been carefully thought out, the vocabulary and/or spelling test portion of this dual package lacks the zest and vitality displayed in the audio cassette reader. They are both educationally and technically sound in their construction, yet it is doubtful if a young student would enjoy this part very much or for very long. It is encased in a too standard testing format with no diversion and not much incentive.

This package is written, it seems to me, for the use of a single individual who wants to learn at home. Had it been developed for use in a professional teaching environment it most certainly should have contained added enhancements such as written lists of tests, sentences and words used—possibly cross-referenced to the book.

There are areas that could be strengthened even now, such as more adequate documentation explaining just how each feature works and what to expect. As it stands now, the one sheet (two sides) explanation given the purchaser just barely meets the needs of the user.

And, though the documentation is a bit brief, the low price gives the buyer good value received and then some.

Overall, this package is well done and worth purchasing if you have a young person who might use it. Educationally it is based on sound principles. Surely, as time goes on, we will see improvements in this kind of computer software that take greater advantage of the computer's ability to entertain and challenge in its own right.

(Available at Radio Shack stores, $19.95))

How To Clear All Graphics Pages

You can clear all your graphics pages by entering the following command: *POKE25,6:NEW*. If you do this, you will not be able to use graphics pages, but you will have more program memory.

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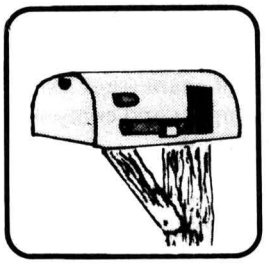
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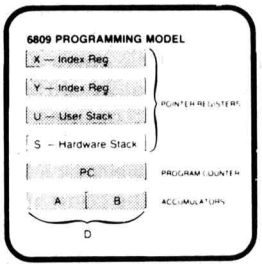
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Software Review...

Disk *Colorcom/E Is "Fine Software"*

By Dr. Lane P. Lester

Reviews are traditionally done by individuals who have some experience in the area under consideration. For example, I was recently asked to review a book on genetic engineering because a few years ago I wrote a book on that topic.

When it comes to software, however, there is something to be said for having a novice as the reviewer. An expert is likely to use this expertise, perhaps unconsciously, as a supplement to the documentation and operation of the software. On the other hand, a beginner will judge the quality of the program strictly on his success in getting it to do the job it claims to do, and he will have to depend solely on what the software supplier gives him. The purpose of all of the foregoing is to justify the following, a review of a smart terminal program from someone who is just now getting his feet wet in telephone communications.

When I started getting the itch to let my Color Computer reach out across the country with telephone wire tentacles I discovered five intelligent terminal programs on the market. The claims of each supplier sent a swirl of baud rates, stop bits, parities, uploads, and downloads coursing through my brain. To try to make some order out of chaos (the chaos of my own ignorance) I wrote to each supplier and compiled a list of comparisons between the programs.

From that comparison I concluded that for someone in my situation, *COLORCOM/E* would be the best choice, while I could see that other programs would be better for other users. My situation is that I have a 32K machine, RS disk drive, Epson MX-80 printer, Hayes SmartModem™ and illusions of grandeur about what I am going to accomplish through telephone communications.

COLORCOM/E was originally available only on ROM pack, but a disk version has just recently been released and is the subject of this review. Most but not all of the features of the disk are present in the ROM version. The program disk is copy-protected, which means that you can't make a backup copy. This is not as rotten as it sounds because Spectrum Projects provides you with two disks of the program for $49.95, and damaged disks can be replaced for $8. There is not much opportunity for damage, because to enter and start the program, you just type RUN"GO." When the title and words PRESS "ENTER" TO START come on the screen, you can put the disk away. No further accesses are needed.

There are four modes of operation in the program: Advanced Entry, Dial, Command, and On-Line. The user can switch from one mode to another by using appropriate keys which are illustrated in the following "mode map":

Command

```
                    .  .  .
            c5/G.   .  .c5/SPACE
                    .  .  .
Advanced Entry c5/?.   On-Line
                    .  .  .
        BREAK/?.    .  .BREAK/BREAK
                    .  .  .
                    Dial
```

Characters to the left of the "/" indicate the key presses to move from the lower mode to the upper, those to the right from upper to lower. Notice that the command mode can be entered directly from any of the other modes by Control-5 (down-arrow and 5). Question marks indicate ignorance on my part.

Advanced Entry—This is the mode you enter when you press *ENTER* to start the program. Before calling the host computer it is possible to type in a message of any practical length to send after communication is established. This can save expensive time in access and/or long distance charges. Data entered in this method go (aside to language freaks: I still consider "data" to be the plural of "datum") into an area of memory referred to as the transmit buffer, while data received from the host are considered to reside in the receive buffer.

Dial—If you have an intelligent modem like the SmartModem you can use this mode to dial the phone for you. This may sound silly, but wait until you have to dial a long distance number (11 digits) with a rotary dial phone five times before the computer answers. It's mighty nice to hit "A/" and have the number redialed. The little loudspeaker on the SmartModem is a nice touch in that it lets you hear a busy signal, or even (horrors!) a human voice when you get a wrong number. Well, this isn't supposed to be a review of the SmartModem, so let's move on.

Command—This mode responds to 24 different key presses to provide an amazing array of options. I should mention that it is also possible to do most of your communicating without fooling with more than a few. Each command can be considered to involve the control of one of five areas:

Communication (L, B, 0 and Q) These commands allow you to set a whole host of different parameters which make it possible to communicate with any computer that knows how.

Display (up and down arrows, shift up and down arrows, T, and X) While either on-line or off-line it is possible to view the data stored in both the transmit and receive buffers.

Mode (G, =, SPACE, and BREAK) See the mode map

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By Bob Withers

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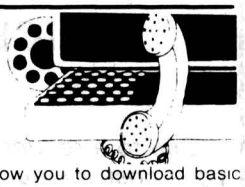
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Tape Version $19.95

By Bob Withers

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It also has a unique feature which can save you much time. it automatically converts all model I and III tokens. This allows you to run most model I and III basic programs just as they are downloaded on your color Computer. This also allows you to send basic programs to any model I or III owner who has a copy of DFT. (DFT is very popular with the Model I and III).

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above.

Disk (R, W, D, S, and E) Here's where the disk version really shines, in its rapid access of disk files. Data can be read into the transmit buffer before going on-line, and the receive buffer can be quickly stored before you accidently hit the *CLEAR* button or the power goes off. D gives you a disk directory, and S and E allow you to save only selected parts of the receive buffer.

Printer (V, P, S, and E) You can set parameters for your printer and print all or selected parts of the receive buffer.

On-Line—Here is where the actual communication between your computer and the host takes place. There are some real nice features in this mode that make communication both powerful and convenient.

To send part or all of the transmit buffer to the host, one presses control-1 or control-2 (down arrow and number key). The transmit buffer can contain one or a number of different files with control characters showing the beginning and end of each file. Either you or the host computer can control the transmission of the files.

Control-3 allows you to freeze or unfreeze the receive buffer so that you store only the material you want.

Control-4 tells you how much memory you have left in the receive buffer. If you run out (the program warns you 80 bytes before this happens) the incoming data start being written over the oldest data.

Control-5 gets you into the command mode.

Control-7 and Control-8 come under the heading of "bells and whistles." You can load an initiation file (to be discussed below) with two 32 character messages that can be sent while on-line. For Compuserve I have my account number in one and my password in the other. For Connection-80 in Woodhaven, NY (212) 441-3755 I have the SmartModem command that dials the phone number as one message and the hang-up-the-phone command as the other.

The ability to create initiation files is just one more evidence of the care that went into this package. On the disk is a program "SETINIT" which allows you to set in advance a number of modem and printer parameters plus write the two messages mentioned in the previous paragraph. These are stored on disk with the name "SYSINITx/BIN" where "x" is a single character you select to distinguish one initiation file from another. When you RUN "GO" and *COLORCOM/E* says PRESS "ENTER" TO START you press instead the single character of the file you want to use. That file is then loaded, and you have those parameters and messages in memory. I have separate files for Compuserve, Dow-Jones, Woodhaven, NY, and Elgin, TX. Each has messages most useful for each system.

I don't know about you, but I get a little suspicious when a reviewer doesn't find anything negative to say about his subject. I got stung not too long ago when I bought a program on the basis of a glowing review with nary a harsh word in it. With that in mind I'd better report some shortcomings of *COLORCOM/E.*

A program's documentation is almost always a good target. Program writers' skills in writing programs are virtually never matched by their abilities in writing documentation. The 21-page manual that accompanies *COLORCOM/E* is not the best that I've seen, and it's not the worst. It took me several readings before I began to feel that I had a handle on what I was supposed to do to use the excellent features of this program. I'm still a little hazy on a few of the functions. In a couple of places corrections had not been made to reflect the change from ROM to disk versions.

The above mode map would have been very helpful. Particularly valuable and almost completely lacking would be examples of communication between host and terminal to illustrate the various functions. I must say that personally I do prefer what could be called the reference manual approach taken here to the tutorial approach taken by the Tandy manuals. Both are actually needed. The tutorial takes you through the system once and makes you feel good about it. And the reference manual serves as a continuing tool as you use and master the software.

I have a few other nits to pick about an otherwise excellent program. For example, it's too easy to hit *CLEAR* and erase everything in the receive buffer; this should require a two-key press for clumsy oafs like me.

It's hard to view all of the contents of the transmit buffer. Although key presses will stop the scrolling, when the end of the buffer is reached the screen clears. It would be much better if the display would pause so that you could read the last few lines.

The printer baud rates of 110-1200 were a poor choice; 600-4800 would have been much more useful. Currently I can only print at 2400 baud so have been unable to use the print functions of *COLORcom/E.* I have to *SAVE* the receive buffer and print it later with my word processor program, *TELEWRITER.*

So as not to end on a negative note about a fine piece of software, I should tell you that I still think I made the right choice. I must also confess that I am having a great time communicating with other computers, and if you are looking for a way to put a new sparkle into your Color Computing this is a good way to do it.

(Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, $49.95 plus 1.00)

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COLOR COMPUTER DISK SYSTEM

We offer a complete disk drive interface system for the color computer, featuring the Tall Grass Technologies Double Density, buffered disk controller card. The disk interface board plugs into the color computer expansion socket and provides for doubling the storage capacity of single density type disk drives by using GCR encoding / decoding techniques. Power may be taken internally from the system or from an external power supply (not normally required even with piggyback 4116's installed). This controller will support up to 4 single/double density, single/double sided 5 & 1/4 inch disk drives. These include Shugart 400 series, Siemens 82, TEAC 50 series, Pertec FD200, MPI B51/52/91/92, Tandon and others. The controller uses standard 10 sector diskettes and does not read or write the soft-sectored IBM style formats used by TRS-80 or FLEX systems. Two reasons for not using a soft sectored system are cost and reliability.

The Tallgrass double density format offers more margin for worn diskettes, dirt etc. and less expensive single density disk drives & diskettes. All you need to add to have a complete disk system is a disk drive / cable.

DISK OPERATING SYSTEM (DOS)

The Disk Operating System for the Tallgrass Technologies Disk controller (CCMD+9) is a full featured "BASIC" compatible operating system. It is fully integrated with the ROM basic system already in the color computer and automatically is initialized upon system power on much the same as the R.S. disk system does. But there is a big difference between that disk system and CCMD+9. First of all we support any mix of 35, 40 or 80 track single or double sided disk drives, which allows a minimum of 4 times the storage capacity of the "other" disk system. We also make far better use of the disk storage space by using sector allocation for each file instead of the granual method of 8 sector blocks which can waste anywhere from 1 to 7 sectors for each file on the disk. For example, on their DOS, if 5 files each required only 2 sectors there would be 40 disk sectors allocated, a waste of 30 disk sectors or almost 4 "granuals". This is not the case in our disk system, only the required number of sectors would be used.

Many other disk systems using a sector allocation system have a problem with file fragmentation and excessive seek time after a disk is used over and over adding and deleting files until it becomes so bad that the disk must be re-formatted to correct the problem. With CCMD+9 this is not the case, as files are deleted the disk space is automatically repacked to help keep files from being fragmented and decrease access time.

The DOS is contained in a ROM on the disk controller the same as the R.S. disk system so you don't have to "bootstrap" the DOS off of a disk and it doesn't get clobbered easily by a runaway program as most ram based systems do. The DOS does "NOT" require Extended Basic and will run on a 4, 16 or 32K system without any modifications. CCMD+9 uses approximately 1K of ram for the disk system which is taken from the top of memory, this allows all previously purchased tape software to function with the disk system, this is not so with the R.S. disk system.

CCMD+9 supports both Basic and Machine language programs. It is easily accessible to the beginner or advanced machine language programmer with easy to use and well documented entry points to perform disk as well as screen/printer/keyboard input & output. It includes 10 disk file functions to open, close, read/write random or sequential files, read specific sector of file, flush sector buffer to file, close & rewind file (re-open) and process disk system errors. The screen/printer/keyboard I/O functions include: input character, output character, output text string, output carriage return, output 2/4 hex characters, output space character and read/write single disk sector.

The "BASIC" interface system allows Basic and Basic programs to communicate with the disk system much the same as the R.S. disk system does with a few added features. It includes both Direct and Indirect basic commands. Direct commands can be executed any time and Indirect commands are contained with "Basic" programs. The Direct commands include: LOAD or SAVE (binary/ASCII basic program disk file), CHAIN (load & execute basic program) and CDOS "disk command". The "CDOS command allows you to execute a specific disk command from the free standing disk system, these include: LOAD/SAVE machine language or memory file, REMOVE one or more disk files, CHANGE disk file name, CHECK disk file for errors, ANALYZE disk directory, STRACK set tracks & sides for disk drive, SCMP set compare on/off, RUN load & execute machine language disk program. GOTO execute machine language program at specified address, and NEW initialize disk. If the "CDOS" command is executed without any command following control is passed to CCMD+9 where any of the previously mentioned commands can be executed directly thus providing total control of the entire system. The command system is easy to learn and remember with a minimum of effort on the users part. The BASIC interface system was designed to be compatible with the existing I/O commands used with tape files for easy conversion and upgrading to disk. When using Basic disk files up to 9 files can be active at once with all disk file memory allocation being done automatically at run time, you don't have to reserve file space as with the R.S. disk system. The indirect basic commands include: Open, Print, Input, Line Input (ext. Basic), EOF, Rewind, Close, Print Using (Ext. Basic), these all function in the same manner as basic tape file I/O.

CCMD+9 has one other unique feature not found in most disk systems. Each disk initialized by the system is assigned a disk label which can be used instead of a disk drive number, the system will automatically locate which drive the diskette is on and use it accordingly. This can be very usefull in basic programs which use files on multiple disks, you don't have to worry which disk belongs in which drive.

Part of the power and flexibility of CCMD+9 lies in the Disk Utility System which allows the system commands to be greatly expanded by adding utility or transient disk commands. These commands are automatically handled by the system so as not to overwrite Basic programs in memory and can even be called by a Basic program in some cases. For example you can perform a disk copy or backup while still preserving a basic program currently in memory, no other system that we know of has this ability. We currently have a list of utilities available and will be adding to it constantly to improve the system.

SOFTWARE SUPPORT

This disk system is the most recent one to enter the color computer disk market and is currently the only one with any disk software to support it. There should be no problem in the future with a lack of software for this system because, it is extremely easy to interface software to. We currently have available for the disk system: a Disk Assembler which allows files larger than memory to be assembled, a Disk Text Editor which makes writing Basic and Assembler programs easy and also will edit files larger than memory, a Disk Text Editor/Processor (WORD PROCESSOR). TEXTPRO1 which is easy to learn and extremely powerful for its price range. TEXTPRO II is an advanced version with expanded features, programmable tabs, 3 line processable headers, decimal/center/right justify/ horizontal tabs, keyboard input processing and more. A Disk Disassembler/Source generator, a Disk system monitor which includes all of the TRSMON monitor commands & has access to all of CCMD+9 disk commands & automatically locates itself at the top of memory to stay out of the way, and a full compliment of disk utilities. The utility disk includes: full disk backup, build disk text file from keyboard, 24 hour screen clock, single or multiple disk file copy, text file executive processor, ASCII/HEX file dump/list/map utility, ASCII file lister/printer, and a disk relabel utility. All at prices far below what other disk system software sells for.

TG-99 Disk Controller w/CCMD+9 DOS ROM	**$159.95**
CCASM9 Disk Assembler	**$ 34.95**
CCEDT9 Disk Text Editor	**$ 24.95**
CCDISS Disk Disassembler Source Generator	**$ 29.95**
CCTPR1 Disk Text Editor/Word Processor TEXTPRO 1	**$ 39.95**
CCTPR2 Disk Text Editor/Word Processor TEXTPRO 2	**$ 59.95**
CCUTLY Disk Utilities	**$ 19.95**
DOSMON Disk system monitor/utility program	**$ 29.95**
CGAME1 HI-RES Graphic games Space Invaders, Meteriods, Space War	**$ 49.95**
CGAME2 Mixed games Battle Fleet, Space Traders, Adventure	**$ 39.95**

SPECIAL LIMITED OFFER

We have a complete disk system package available that includes: a 40 track single sided disk drive with power supply, case, 2 drive cable, TG-99 controller w/CCMD+9 and a disk containing CCUTLY disk utilities and CCEDT9 disk editor all assembled and tested for $499.00

Additional 40 track drive with power supply & case tested $300.00

For double sided drives add $100.00 per drive. Add $5.00 per drive for shipping. NO COD's on disk drives or disk system special. Shipping for disk controller add $2.50, for Disk software only add $1.00. Visa & M/C add 3% (this is what the bank charges us).

Manufactured under license from Tall Grass Technologies

CO RESIDENT EDITOR/ASSEMBLER

Co-resident Editor/Assembler that will allow the user to create, edit and assemble machine language programs for the color computer. The editor portion of the program is similar to the text editor in TEXTPRO. The assembler will output machine object code to either cassette tape in a 'CLOADM' readable format or directly to memory for direct execution. The assembly listing can optionally be output to the printer connected to the RS-232/Printer port on the color computer. All errors are displayed with a full text message for easy identification. The assembler supports the full compliment of the M6809 instruction set and also will cross assemble 6800 source code to produce M6809 compatible object code.

CO-RES9 **$39.95**

SYSTEM MONITOR

TRSMON is a 2K system monitor program that will allow you to explore the workings of the color computer. It features 9 debuging commands, tape load and save compatible with Basic "CLOADM", up/down load via RS232 port, terminal package that allows the color computer to be used as a terminal at baud rates up to 9600 baud and a printer driver to direct display output to the printer for memory dumps, disassemblies etc. The program is position independent so it can be moved anywhere within the system memory. A very powerful tool at a very reasonable price. Commands include:

Memory examine & change, Goto defined address, Load Tape program (w/offset), Load Motorola S1-S9 file (RS232), Save Tape program, Send memory file S1-S9 (RS232), Set and/or display breakpoints, Remove one or all breakpoints, Define printer/terminal baud rate, Set and/or display registers, Dump memory in Hex & Ascii format, Disassemble memory file, Terminal mode & optional buffer, Fill memory, Move block of memory, Find memory byte sequence, Exit monitor to Basic, Exit monitor to Rom Pack ($C000), Re-initialize monitor, Direct output to printer.

TRSMON ON TAPE	**$19.95**
TRSMON on 2716 Eprom	**$34.95**

8K COLOR RAM/EPROM CARTRIDGE HOLDS 4-2716 EPROM or RAM	**$24.95**
2K RAM CHIPS $19.95	**2716 EPROMS $14.00**
5¼" DISKETTES, SOFT OR HARD SECTOR, BOX OF 10	**$30.00**
MOTOROLA 6809 PROGRAMMERS MANUAL	**$11.95**
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TEXTPRO
TEXT EDITOR/PROCESSOR

TEXTPRO is a complete text editor & text processing program for the Color Computer. The program includes our powerful full function text editor plus the added features of a text processor. The entire program utilizes only 6K of memory space including the tape, screen and keyboard buffers. It is extremely fast in editing and processing text files and is compatible with Basic ASCII formatted tape files.

The Editor itself includes 24 commands including string search & replace, line and automatic line edit modes which allow you to insert, delete, change or add characters. Automatic line editing allows you to skip forward and backward for checking and editing, all screen editing immediately updates the screen so you know exactly what you are doing at all times. The Editor also has commands to move or copy single lines or blocks of text from one place to another. Some of the other commands include Tape load, save and append; Automatic line numbers, delete line, set input line length and printer output.

The Text Processor includes 29 commands for formating the output, some of them include: page length, left margin, top & bottom margin, line length, justify & fill modes, page heading, center line, double width print, margin control, single, multiple & special indent modes, test lines left on page, display & input from keyboard and even special control codes can be sent to the printer for different print densities etc. It even has a repeat command with a next command to redo all of or a portion of the file as many times as needed. TEXTPRO will turn your color computer into a full fledged text processing machine at a price you won't believe. Available on 'CLOADM' compatible cassette.

SPECIAL INTRODUCTORY PRICE $29.95
RS. DISK VERSION $49.99

DATAPACK
DATA COMMUNICATIONS PACKAGE

DATAPACK is a Terminal package program for the COLOR COMPUTER, allowing you to use the color computer as a buffered computer terminal through a modem to a time sharing network or as a direct connect terminal to another computer system at rates up to 9600 baud. This program is more than a standard "Videotext" type program in that it will allow you to save data stored in the buffer either to cassette tape, or output a hard copy to a printer. The data buffer is automatically set to the maximum size of your system memory when entered to allow maximum space for saving data. The program includes features to send control codes and to enable or disable keyboard echo. When the terminal mode is exited the contents of the buffer may be viewed on the screen or saved to tape for later loading. Also the RS-232 port can be used to plug your printer back in for sending the screen buffer to the printer. An additional feature is the ASCII format that is used on tape is compatible with the CER-COMP Text Editor program and BASIC, enabling you to edit or delete unwanted information.

PRICE: $24.95 ON CASSETTE
RS. DISK VERSION $49.95

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Commentary...

Techy Yes! Preppy No! At Least for You—CoCo

by Sue Searby

We have all been aware of the popular "Preppy" look. Saddle, shoes, alligator polo shirts, and words like "Mummy" and "Really" are the keys.

Well I am here to tell you that Preppy is out and "Techy" is *in!* Do not delay your transition (or upgrade, as a Techy would say.)

The new compter age has given birth to *the* new look—the look of being at one with technology. The trappings of circuitry and software must be second nature. Computereese shall be your native tongue. To plug into the new logic, begin with these simple steps.

Techy Accessories

Always have a fully populated circuit board in your top desk drawer. It must be in plain view of a visitor when you reach for a pencil.

Be sure to carry a few small IC chips and a washer or resistor in with your change.

Do not use an ordinary ruler. Keep a flow-chart template for drawing straight lines.

As ASCII to HEX conversion chart should be kept next to your calculator (with a few computer memory addresses scribbled in the margin.)

The Techy Look

SHOES: Definitely leather—they will show and hold small flecks of solder best And do imbed two or three small resistors along the stitching of the upper sole on the outside of each shoe. (The leads will hold them firm.) Please match the color of the value stripes with your outfit. The look we are after is Techy—*not* Tachy!!

PURSE OR CARRIER: It must have an outside pocket or flap in which you casually carry an Unger cordless soldering iron. Women may keep the required two micro-sized screw drivers here as well. Men should wear these in the shirt pocket.

MEN'S SHIRT POCKET: Along with the micro screw drivers, carry approximately 18 inches of fine solder coiled in a circle of about one inch in diameter. Carefully drape the last inch over the edge of the pocket.

Techy Talk

This is the true mark of a good Techy. The more fluent in Computereese, the better. Cause as much confusion as possible. Hide simple facts with a barage of technical jargon. Only other Techys should understand you. Throw in serial, jparallel, RS232, baud, bit, byte, K, for good measure. For common conversation, the following are absolute musts!

You do not talk or discuss—you "interface."

A Techy does not simply forget. He experiences a "Read Error." Or he may say he "missed a RAM refresh cycle."

When you wish to introduce a new topic, ask everyone to "hit reset" or "reboot."

A doctor's visit should be referred to as a "diagnostic circuit check."

A Techy does not argue. He objects of disagrees simply by announcing "syntax error—retry" indignantly.

Of course, when excusing a tangled tongue or mistake of mouth, "I/0 Error!" with a smile is a Techy response.

If a Techy finds someone rather dull or stupid, he labels the other a "serial processor with a slow clock!"

Lastly, on a white diskette cover, scrawl the following message to be left on your desk at noontime to prove a real Techy lives here.

OUT FOR A BYTE
BACK IN A BIT

NOVA-PINBALL

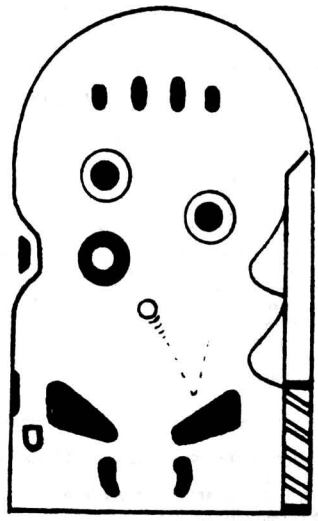
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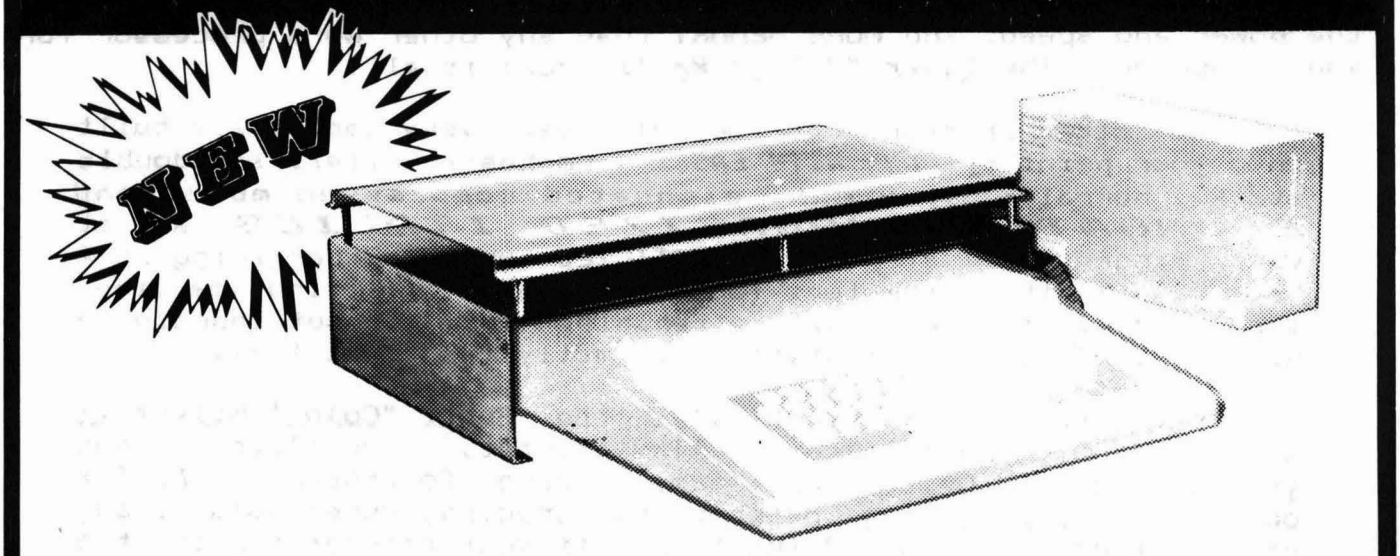
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Shoot bugs in formation, before they swoop down to attack you! $9

BUMBLEBEE SOFTWARE

Color Computer Machine Language Programs
P.O. Box 25427
Chicago, IL 60625

Color Computer Expansion Interface



AVAILABLE NOVEMBER 1982!

- ***RS DISK COMPATIBLE*** *— NO modification required*
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Super "Color" Writer II

A "ROLLS ROYCE" FOR YOUR COLOR COMPUTER

RAINBOW CERTIFICATION SEAL

If you are contemplating buying a word processor for your TRS-80C Color Computer or TDP System 100 Personal Computer, look no further!! The ***Super "Color" Writer*** is the most powerful and most versatile word processor available. This ***user-friendly*** program gives you many times the power and speed, and **MORE MEMORY** than any other word processor for your computer. The ***Super "Color" Writer*** does it all!

No other program lets you fully use every capability built into your printer, ***AND WITH EASE!*** **Emphasis,** *italics,* **double strike,** normal mode, compressed, **elongated-compressed mode, and** ***ELONGATED EMPHASIZED ITALICS*** are at your fingertips, all within **JUSTIFIED** text. Underlining is a breeze! All the parameters for proper page formatting (margins, page length, etc.) are fully alterable. Yet, without changing a single thing you can print text perfectly the first time.

Don't think for a minute that the **Super "Color" Writer II** won't work with your letter quality printer. There's no reason you can't give H_2O its proper name or have footnotes.[1] As for bold print, underlining, proportional spacing, **super bold** or any other printer-controlled function - if your printer has it, the **Super "Color" Writer II** can do it! You can also freely exchange thimbles or daisy wheels to change to italics, or to a totally different typeface with the pause print feature.

And the ***Super "Color" Writer II*** has the exclusive **WINDOW** to make your formatting pleasant and perfect. Enter the window to view your whole text as it will be sent to the printer, **whatever your margins, from 1 to 200 or more!** No longer will you be tied to seeing only 32, 51, 64 or whatever number of characters on a line. You can see that your text is centered, headers and footers are always properly placed, and your columns are correct.

With the ***Super "Color" Writer II*** screen editing is a snap; the commands are powerful and hard to forget. You can edit all your BASIC PROGRAMS TOO! With all these features, you must surely agree that this is the **"ROLLS ROYCE"** of word processors. To learn more, refer to the Nelson Software Systems ad in this magazine. And don't forget that the ***Super "Color" Writer II*** is only one important part of the ***Super "Color" Library***, which includes the ***Super "Color" Terminal***, the ***Super "Color" Mailer***, the ***Super "Color" Disk-ZAP*** and the soon to be released ***Super "Color" Calc*** and ***Super "Color" Database.*** No other company gives you such outstanding products and support. **You can buy theirs now and ours later, OR you can save your money and get the best from the very start!**

This document was prepared using a ***TRS-80(TM) Color Computer,*** the ***Super "Color" Writer II,*** an ***Epson MX-80 Graftrax Plus (TM),*** and an ***NEC Spinwriter 3510 (TM)*** to illustrate the great flexibility in formatting allowed by the ***Super "Color" Writer II.***

[1] Spinwriter is a trademark of NEC Information Systems, Inc. MX-80 Graftrax Plus is a trademark of Epson America, Inc. TRS-80 and TDP System 100 Personal Computer are trademarks of the Tandy Corporation.

THE ULTIMATE IN COLORCOMPUTING

For the TRS-80 Color Computer and TDP System 100 Personal Computer

Super "Color" Writer II

By Tim Nelson

The Rolls Royce of Word Processors

The **Super "Color" Writer** is a FAST, machine code, full featured, character (screen) oriented word processing system for the TRS-80™ Color Computer and ANY printer. The video display is styled after a professional phosphor (green characters on black background) display. for hours of use without eye fatigue (optional orange on black). The unique print WINDOW frees you from 32, 51 or 64 character lines FOREVER! This window can be moved anywhere in the text file, up, down, left or right to display the text as it will be printed without wasting paper. You can create or edit **Super "Color" Terminal** files, ASCII files, BASIC programs or Editor/Assembler source listings. It's simple enough for beginners with 4K and . . . for the professional writer with a 32K disk system and a lot to say, there's plenty of room to say it!

COMPARISON CHART	SUPER COLOR WRITER			THE COMPETITION		
System Size	4K	16K	32K	4K	16K	32K
TAPE: Text space	N/A	7K	23K	N/A	2K	18K
ROMPAK: Text space	2.5K	16K	31K	N/A	N/A	N/A
DISK: Text space	N/A	5.5K	21.5K	N/A	0.5K	16.5K
Right Justify		YES			NO	
Video Window		YES			NO	
Edit any ASCII File		YES			NO	
Programmable Function		YES			NO	

The figures speak for themselves and with professional features like PROGRAMMABLE function string commands to perform up to 28 commands automatically. PROGRAMMABLE text file chaining, PROGRAMMABLE column insert & delete, and right hand JUSTIFICATION with punctuation precedence, the choice is clear but there's still more! In their September '82 issue, "80 MICRO" says, "The Color Computer has finally come of age. Nothing illustrates that coming of age better than this offering (SUPER "COLOR" WRITER) by Nelson Software". The **Super "Color" Writer** takes full advantage of the new breed of "smart printers" with Control codes 1-31, 20 Programmable control codes 0-255 for special needs. Works perfectly with all Epson, Radio Shack, Okidata, NEC, IDS, Centronics, Citoh, Smith Corona, Diablo Etc., Matrix, or Letter Quality Printers.

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By Dan Nelson

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Software Review...

A Pretty Maze And Few Clues Help You *Escape*

You are in the top floor of a building and looking for a way to *Escape*. For those of you old enough to remember Fibber McGee and Molly, as Molly used to say: "Tain't easy McGee!"

It isn't. But to help, there are some clues which are thrown at you by a seer, a poet, and a bunch of other people and creatures which inhabit rooms at the top of the building. The only way down is by an elevator ride—but the elevator has a bad habit of going a mite too fast unless you know the five digit code.

And how do you get the code? From the inhabitants of the rooms, of course.

You reach the rooms by traveling through a blue and red maze. Use the arrow keys and look for doors. Enter them at your own risk—some will provide clues. Others, well. . .

We suppose *Escape* can be classified as an Adventure of the graphic variety. It is fun to play, although don't think you can solve it quickly or easily. It requires some mapping as well as figuring out just what the clues mean.

By the way, the easiest thing to find was the elevator. But, if you get in and enter the wrong code . . . you make a super-fast trip downstairs from which you will not survive.

This one takes some figuring out. Plan to spend a number of hours at it.

(Color Software Services, P.O. Box 1708, Dept. R, Greenville, TX 75401, $19.95 plus $2.25 s/h)

Software Review...

"Rosa's Isn't Rosy To Our Reviewer

One of the great pleasures of solving an Adventure is becoming involved in the verbal give and take unique to each author. Even the most frustrating puzzle can be fun if the author is humorous, mysterious, or tricky in his presentation.

Style in an Adventure is just as important as it is in a book, without it you just have a basic exercise in reading.

Madam Rosa's Massage Parlor falls far short of all expectations (whatever yours may be) and it's not even a very good Adventure. It was written on the level of a slightly voyeuristic 15-year-old recluse without the deviousness one would expect for $15. (One good thing, Softcore Software sent me the tape within a week and I paid by personal check.)

The Adventure consists of getting into Madam Rosa's establishment (the hardest part) and eventually getting out with some hidden photographs. As it says in the ads, it's equipped with sound—a very annoying sound which only ceases when you try a command. I turned the sound off on my TV.

If the author had been more cleaver (the HELP command always tells you to spend $1 and buy the hint sheet) or less sleazy, it might be interesting. As it is now, don't waste your money.

(The Softcore Software Co., 9 Southmoor Circle, Kettering, OH 45429, $15)

—Dr. Michael J. Keyes

The Dragon's Byte...



Slay Your Turkey With These "Duel" Programs

By Bill Nolan
***Rainbow* Contributing Editor**

16K ECB

(Mr. Nolan, an experienced Dungeonmaster in a popular fantasy role playing game on a weekly basis, is the president of Prickly-Pear Software.)

Happy Thanksgiving, fantasy gamers! This month you once again get two programs. However, they combine to do one job; they create intelligent weapons for use in your game.

Why two programs? Well, we wanted to illustrate a method you can use to fit a larger program into your computer than would otherwise be possible.

Many times, a program with a lot of DATA statements would take up a lot less room except that all of the DATA ends up in memory twice. You usually read this DATA into arrays so you can find the piece you want easily and quickly, and keep it in order so your program can use it. Thus, it is memory once in the DATA statements, and again in the array.

If your program is really long, this may create a memory problem. What we did here is put all the DATA statements in a separate program, "SWORDDAT." This program creates a data file on tape which is read into an array by the main program, "SWORDS." The net result is that the main program doesn't need the DATA statements, and is a lot shorter!

In this case, the program isn't really that long, but we did it this way anyhow, just to illustrate the method. You can do this on disk, too, and we will tell you the changes as we come to them.

The first program, "SWORDDAT," is nothing but DATA statements until you get to line 200, which opens the cassette recorder as a device (that's what the #-1 is, the recorder is device #-1), thus preparing the computer to print the DATA to the tape. Lines 210 to 230 are a FOR/NEXT loop which reads each DATA item in order and prints it on the tape. Line 240 closes the cassette recorder as a device, thus telling the computer there will be no more DATA right now.

After you have this program in the computer (and have made a copy—and backup copy—of it) put a blank tape in the recorder, press PLAY and RECORD, and RUN the program. It will create a DATA file on the tape, which will be read by the second program.

If you want to use a disk, change the PRINT in line 220 to WRITE, and make the #-1 in lines 200, 220, and 240 into #1 (without the minus). It will then open the disk as a device and write the data file there. Make sure you have a disk in the drive when you RUN the program.

The second program, "SWORDS," creates the intelligent weapons. When you run it, be sure you have your DATA tape, which you made with Program One, in the recorder with PLAY pressed. This is because the second program will read all this DATA into four arrays.

Line 45 opens the cassette as a device, lines 50 through 90 are a series of FOR/NEXT loops that INPUT the DATA from the tape, and line 100 closes the cassette as a device. Again, if you have a disk, change the #-1 in lines 45, 60, 70, 80, 90, and 100 to #1 (eliminating the minus).

So, what does the program do? Well, like we said, it creates an intelligent weapon. An intelligent weapon? That's a weapon which contains the spirit of some poor soul, and thus has a mind and abilities requiring intelligence. It will be able to communicate with the person carrying it in some way, and will have some special powers. Please remember that it will not necessarily have a cooperative nature!

By the way, to answer a question some of you have asked, these programs are not games. They are programs to help people when they play fantasy role-playing games. Any good toy or game store will help you make a selection. In general, the more complicated the game seems at first, the better it will hold your interest. Also, in general, the rule books are very poorly written. Be prepared to have to "wade" through them.

Now, on with the intelligent weapons. These weapons are usually swords—but not always! One that comes to mind was a lowly daggar by the name of Magle Dragondancer. Magle was found in a dungeon treasure hoard by an elven fighter/magician who still carries him today. Magle has some interesting abilities. His hilt is decorated with diamonds, emeralds, rubies, jet, and blue saphire gemstones, and whenever he is within five miles of an evil

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dragon, the appropriate colored gem starts glowing!

Now, that's handy, but can make you nervous, too! Like the time the party was on the eighth level of a dungeon, and all the gems began glowing. Magle is used in battle by being thrown, and he teleports back into the hand of his bearer after each throw, thus allowing two attacks every round. He is only +1 to hit, but is +3 damage (because of his accuracy—kind of a guided missile). He always does 12 points of damage to an evil dragon, and he will fight on against these dragons even if his bearer is slain.

Another interesting weapon we encountered was a long sword named Fred. He became so famous that the fighter who found him was forever after known as Fredbearer. No one knows his true name. When Fred was discovered, his new bearer picked him up, and Fred said, "Hello." The happy fighter immediately asked him what sort of powers he had, and Fred said, "not much."

He went on to say that he was only +1 to hit, and further, that it was his clumsy ineptness that had caused the death of his previous bearer. Fred went on to apologize profusely and at great length for his total uselessness. He went so far as to suggest that the most profitable course would be to melt him down and sell the scrap!

It turned out that Fred was being a little overmodest. In the first fight where he was used, it was discovered that he was indeed only +1 the first round. Fred was a sword of dancing, and he rose progressively until he was +4, and then fought on by himself. After the fight, his owner was feeling better about the sword, but bad about his extensive injuries. That was when Fred announced that he could "heal" him!

He then tried to cheer up the injured Fredbearer by pointing out the secret door in the north wall, and asking his new friend whether he wanted any of the gold that was behind it. About an hour later he warned Fredbearer that the "thief" with them was really an assasin, and was chaotic evil in alignment. With all his powers, though, Fred never got over his terrible inferiority complex, and had a tendency to loudly berate himself at every opportunity.

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As always, if you have any questions, write to me here at Prickly-pear Software, 9822 E. Stella Road, Tucson, AZ 85730.

I think that's about it for this month, and I hear the watch dragon on the roof roaring that the mailman is coming, so I'd better get this in an envelope. Don't eat too much turkey!

Listing 1

```
5 CLEAR2000:DIM S1$(2,6),S2$(9),
S3$(10),S4$(16)
10 'MAGIC SWORDS
20 'BY PRICKLY-PEAR SOFTWARE
30 CLS0:PRINT@75,"RANDOMIZING";:
PRINT@490,"HIT ANY KEY";:K$=INKE
Y$
40 K$=INKEY$:IF K$="" THEN X=RND
(0):GOTO 40
42 SOUND 150,1
45 OPEN "I",#-1,"SWORDS"
50 FOR X=1 TO 2:FOR Y=1 TO 6
60 INPUT #-1,S1$(X,Y):NEXT Y,X
70 FOR X=1 TO 9:INPUT #-1,S2$(X)
:NEXT
80 FOR X=1 TO 10:INPUT #-1,S3$(X
):NEXT
90 FOR X=1 TO 16:INPUT #-1,S4$(X
):NEXT
100 CLOSE #-1
110 CLS:X=RND(25):IF X=25 THEN Y
=6 ELSE IF X>22 THEN Y=5 ELSE IF
 X>19 THEN Y=4 ELSE IF X>14 THEN
 Y=3 ELSE IF X>8 THEN Y=2 ELSE Y
=1
120 GOSUB 1000:X=RND(100)
130 IF X>80 THEN Y=9 ELSE IF X>6
0 THEN Y=8 ELSE IF X>55 THEN Y=7
 ELSE IF X>30 THEN Y=6 ELSE IF X
>25 THEN Y=5 ELSE IF X>20 THEN Y
=4 ELSE IF X>15 THEN Y=3 ELSE IF
 X>5 THEN Y=2 ELSE Y=1
140 GOSUB 2000
200 XX=1:Z=0
210 IF XX>PA THEN 400 ELSE X=RND
(100)
220 IF X>98 THEN EP=EP+1:GOTO300
230 IF X>92 THEN 350
240 IF X>87 THEN Y=10 ELSE IF X>
82 THEN Y=9 ELSE IF X>77 THEN Y=
8 ELSE IF X>66 THEN Y=7 ELSE IF
X>55 THEN Y=6 ELSE IF X>44 THEN
Y=5 ELSE IF X>33 THEN Y=4 ELSE I
F X>22 THEN Y=3 ELSE IF X>11 THE
N Y=2 ELSE Y=1
250 PRINTS3$(Y)
260 IF Z>0 THEN 360
300 XX=XX+1:GOTO 210
350 Z=2
360 X=RND(92):Z=Z-1:GOTO 240
400 IF EP=0 THEN 900 ELSE XX=1:Z
=0:PRINT"HIT ANY KEY TO SCROLL U
P THE    EXTRAORDINARY POWERS.":
K$=INKEY$
```

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```
405 K$=INKEY$:IF K$="" THEN 405
ELSE SOUND 150,1
410 IF XX>EP THEN 900 ELSE X=RND
(100)
420 IF X>97 THEN 600
430 IF X>96 THEN Y=16 ELSE IF X>
94 THEN Y=15 ELSE IF X>88 THEN Y
=14 ELSE IF X>81 THEN Y=13 ELSE
IF X>75 THEN Y=12 ELSE IF X>67 T
HEN Y=11 ELSE IF X>61 THEN Y=10
ELSE IF X>54 THEN Y=9 ELSE IF X>
47 THEN Y=8 ELSE IF X>41 THEN Y=
7
440 ELSE IF X>34 THEN Y=6 ELSE I
F X>28 THEN Y=5 ELSE IF X>22 THE
N Y=4 ELSE IF X>15 THEN Y=3 ELSE
 IF X>7 THEN Y=2 ELSE Y=1
450 PRINTS4$(Y)
460 IF Z>0 THEN 610
500 XX=XX+1:GOTO410
600 Z=2
610 X=RND(97):Z=Z-1:GOTO430
900 PRINT"HIT 'R' TO REROLL, 'Q'
 TO QUIT":K$=INKEY$
910 K$=INKEY$:IF K$<>"Q" AND K$<
>"R" THEN 910 ELSE SOUND 150,1
920 IF K$="R" THEN 110 ELSE END
1000 PA=0:EP=0:PRINT"INTEL.":PRI
NTS1$(1,Y):PRINT"CONTACT: ";S1$(
2,Y)
1010 IF Y=1 THEN PA=1 ELSE IF Y<
4 THEN PA=2 ELSE PA=3:IF Y=6 THE
N EP=1
1020 RETURN
2000 PRINT"ALIGNMENT: ";S2$(Y):R
ETURN
```

Listing 2

```
10 'SWORD DATA
20 'BY PRICKLY PEAR SOFTWARE
30 DATA "12    1 PRIMARY ABILITY
","13    2 PRIMARY ABILITIES","1
4    2 PRIMARY ABILITIES","15
 3 PRIMARY ABILITIES","16    3 P
RIMARY ABILITIES +          REA
DS NON-MAGICAL MAPS         AND
 LANGUAGES"
40 DATA "17    3 PRIMARY ABILITI
ES AND          1 EXTRAORDINARY P
OWER, +         READS LANGUAGES A
ND              MAGICAL WRITINGS"
50 DATA SEMI-EMPATHY,EMPATHY,SPE
ECH,SPEECH,SPEECH,SPEECH + TELEP
ATHY
60 DATA(CHAOTIC GOOD,CHAOTIC NEU
TRAL,CHAOTIC EVIL,NEUTRAL EVIL,L
AWFUL EVIL,LAWFUL GOOD,LAWFUL NE
UTRAL,NEUTRAL (ABSOLUTE),NEUTRAL
 GOOD
70 DATA "DETECT SHIFTING ROOMS O
R WALLS  IN A 10' RADIUS","DETEC
T SLOPING PASSAGES IN A 10'RADIU
S","DETECT LARGE TRAPS IN A 10'
    RADIUS","DETECT EVIL/GOOD IN
```


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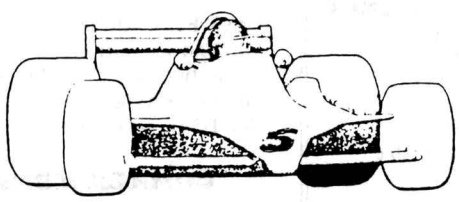
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```
 A 1Ø' RAD","DETECT PRECIOUS MET
ALS IN A 2Ø' RADIUS"
8Ø DATA "DETECT GEMS IN A 5' RAD
IUS","DETECT MAGIC IN A 1Ø' RADI
US","DETECT SECRET DOORS IN A 5'
     RADIUS","DETECT INVISIBLE O
BJECTS IN A   1Ø' RADIUS","'LOCA
TE OBJECT' IN A 12Ø' RAD."
9Ø DATA "'CHARM PERSON' ON CONTA
CT - 3   TIMES A DAY","'CLAIRAUD
IENCE', 3Ø' RANGE, 3   TIMES A D
AY","'CLAIRVOYANCE', 3Ø' RANGE,
3    TIMES A DAY","DETERMINE DEP
TH AND DIRECTION,  2 TIMES A DAY
","'ESP', 3Ø' RANGE, 3 TIMES A D
AY"
1ØØ DATA "'FLYING', 1 HOUR A DAY
","'HEAL, 1 TIME PER DAY","'ILLU
SION' LIKE A WAND, 2 TIMES PER D
AY","'LEVITATION', 1 TURN DURATI
ON, 3TIMES PER DAY","'STRENGTH',
 1 TIME PER DAY       (WIELDER ON
LY)"
11Ø DATA "'TELEKINESIS', 2,5ØØ G
P WEIGHT, 2 TIMES PER DAY","'TEL
EPATHY', 6Ø' RANGE, 2 TIMES PER
DAY","'TELEPORTATION', 6,ØØØ GP
WEIGHT1 TIME PER DAY","'X-RAY VI
SION', 4Ø' RANGE, 2    TIMES PER
 DAY"
12Ø DATA "PLAYER CHOOSES 1 EXTRA
ORDINARY  POWER","PLAYER CHOOSES
 1 EXTRAORDINARY  POWER AND ROLL
S FOR A SPECIAL   PURPOSE"
2ØØ OPEN "O",#-1,"SWORDS"
21Ø FOR X=1 TO 47:READ A$
22Ø PRINT #-1,A$
23Ø NEXT
24Ø CLOSE #-1
```


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Software Review...

Cooking With CoCo Is Made Easy

Let's suppose you're having a party tomorrow evening, with about two-dozen invited guests. You've decided to serve a casserole, but it has a lot of ingredients and your recipe came from the pages of some "singles" magazine. "Serves two," it says. Great. You're going to have to convert the quantities of 16 different ingredients doled out for a demure duo to fit the aggregate appetite of a couple of dozen hungry party-goers.

Do you reach for your pencil and pad? Your calculator? Not if you've got *Recipe File*, a handy data file program from Colorsoft. This program not only stores your recipes for you on cassette, but will adjust the ingredients to accommodate any number of people.

The *Recipe File* data tape is organized in three parts. It has a directory file that contains the names of the stored recipes and their position on the cassette. It has position marker files that are used to aid the recipe file program in tape positioning. And, it has recipe data files that contain the actual recipes that you provide.

The program has ten different options to aid you in creating and maintaining a recipe file on cassette. Putting these options to work, when and as required, the program will read from the tape and display the contents of your recipe file directory on the screen. It will read a recipe from your cassette tape into the program's memory from where it may be accessed by using some of the other options. It will write recipes onto the cassette tape, or delete or edit them. And it will perform other tasks, such as adjusting the quantities of ingredients to the number of required servings.

There's another important item which needs to be mentioned here; and that is that if you're going to take full and proper advantage of the *Recipe File* for cooking purposes, you're going to have to have a line printer in order to get the recipe to the mixing bowl. Or, lacking that particular accessory, you could move your CoCo into the kitchen. Which might not be such a bad idea, considering that then you could eat all your meals without ever leaving the keyboard!

The *Recipe File*, however, has more than culinary capabilities, as this is a data-file program, a storage and retrieval system, and not a cookbook. It can be easily modified to keep track of your records, coin or stamp collection or library.

A handy utility in 16K Extended Basic. And, it features a tape of favorite "Texas-style" recipies, too, at an additional cost.

(Color Software Services, P.O. Box 1708, Dept. R, Greenville, TX 75401, $21.95)

—Courtney Noe

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AT LAST! Help for the BASIC programmer. **BASIC AID** is an indespensable addition to the Color Computer. It will save you valuable time and effort. If you write or modify BASIC programs, you need **BASIC AID.**

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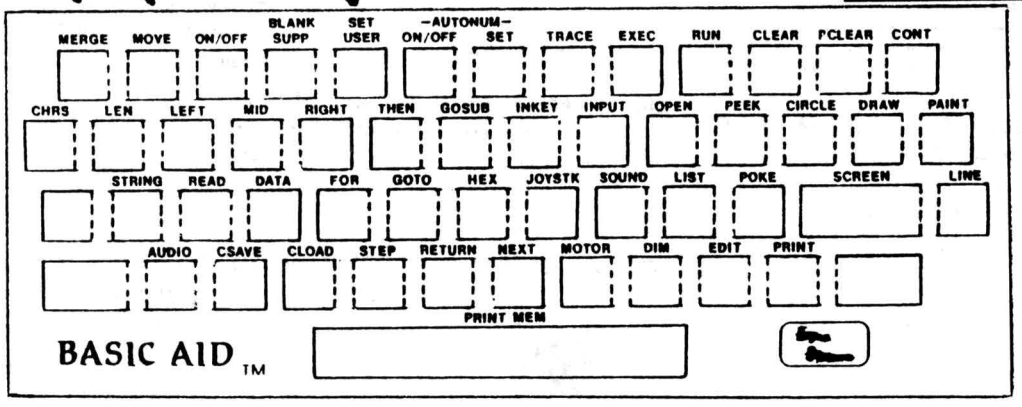
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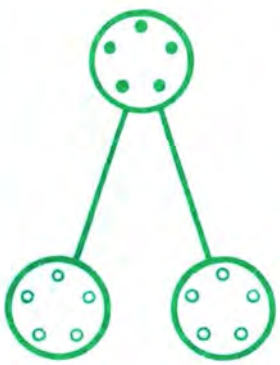
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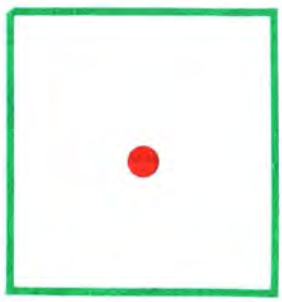
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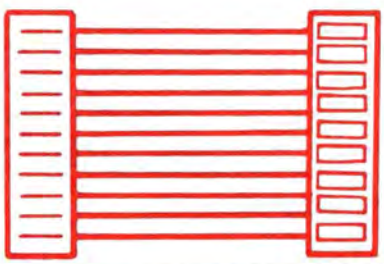


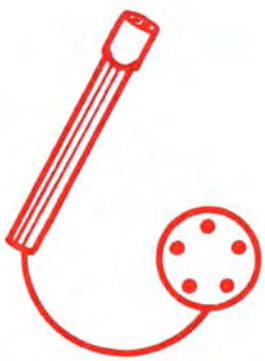
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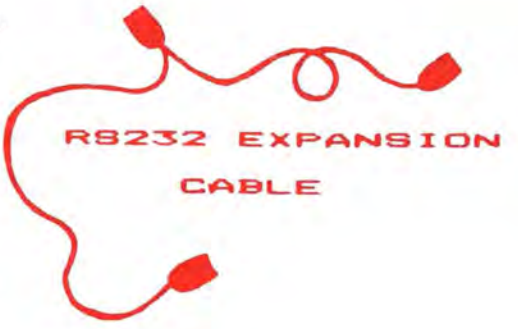
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PIPELINE

OUR APOLOGIES TO those friendly folks at Basic Technology in Ortonville, Mich.—and to many of you—for jumping the deadline on an advertisment which ran in *the Rainbow* last month a month early by mistake. The ad, which was for Basic Tech's BT-1000 Expansion Interface and their BT-1020 Clock/Calendar was supposed to have debuted this month, not last. Needless to say, the products were not ready yet. Please know that the fault is completely ours, not theirs. We're sorry for any inconvenience we may have caused you.

* * * * * *

MOVING EXPERIENCES ARE the order of the day for Nelson Software and Frank Hogg Laboratory. Both have expanded to larger quarters. Nelson is now located at 9072 Lyndale Ave. S., Minneapolis, MN 55420 and Hogg Lab at 770 James Street, Syracuse, NY 13203. By the way, Frank is now located in the Regency Tower—sounds pretty spiffy. We understand a new logo is in the works for Hogg Labs to match the new location.

* * * * * *

WE ARE SAD TO report the passing of Fred Simon, who wrote a column for the Cincinnati Enquirer and the Gannett newspapers chain. Fred's subject matter was computers and electronics and he devoted a portion of one of his recent offerings to *the Rainbow*. Fred was a true fan of the 80C and we know many of you who read and enjoyed his column coast-to-coast will miss him.

* * * * * *

HAVE YOU SEEN THE INSIDE of a TDP-100 yet? If so, rumor has it you have glimpsed the future: The CoCo "F" Board revision. Although it operates exactly the same as does CoCo (take it from some people we know who have already purchased one), the TDP-100 does have a different board. And, we understand, it is what will be shipped from Radio Shack in its new Color Computers.

"F" Boards have the power suppl located off the board, a RF shield tha covers only the RAM and CPU chip and jumpers which are labeled eithe 16K or 64K. There are a few othe minor changes, such as the door of th expansion slot attached to the chassis o the computer itself as opposed to th cover and new locations for some of th test points. It's a real nice computer, b the way. Pretty, too.

But a 64K jumper position? Could it be that CoCo will soon be available in 64K? Could it be there will be another operating system: Perhaps called something like RS-9? Does RS-9 sound like OS-9? Maybe. Keep tuned to this station for further details . . .

* * * * * *

SPEAKING OF RADIO SHACK, WE keep hearing those silly rumors of the demise of CoCo. That there will be "another new" Color Computer coming.

As best we can determine, the answer to the first one is extremely doubtful. But, as to the second, the response is probably—but not what you think.

Look at the issue of CoCo's demise in another way: Its selling like hotcakes and Tandy keeps releasing new products for it all the time. For instance—the X-Pad, the disk versions of Color Scripsit, Spactaculator and a host of other things. CoCo is the ideal computer for the home and small business—affordable, powerful and easy to operate. And, as must be obvious from these pages, it has an extensive (and growing) software base.

Purely in the "maybe" department is the other half of this rumor—that there will be a new Color Computer. The way we have heard it, the new machine will be in the $3,000 range and will be geared to the business market—but with color. The unconfirmed speculation we heard was that this new machine—a Model 12?—would fall in somewhere between Tandy's Model III and new Model 16. But, it's *not* a new CoCo.

* * * * * *

THE NAMES ARE CHANGED TO *Haywire, Space Raiders* and *Color Star Pilot* but the programs are the same you have heard about before. Mark Data Products' *Color Berserk* is now *Haywire*, its *Space Invasion* has been renamed *Space Raiders* and Circle City Software says that its *Startrek* program is now to be called *Color Star Pilot.*

* * * * * *

FOR THOSE OF YOU looking for a comprehensive source of information about products for the 80C, consider the *Color Computer Catalog* from ALIS, 3705 Mary Ellen NE, Albuquerque, NM 87111. Edited by former librarian Dr. Robert Divett, it is a fine rundown on all the products for sale for the CoCo—40 pages in all. And, when a product *has* been reviewed by someone, that is shown, too. While the cross-reference of reviews is not totally complete, it's interesting to note that there are more from *the Rainbow* than anyone else (actually, more than everyone else).

* * * * * *

WANNA TALK TO ANOTHER COCO? There is a new BBS called Silicon Rainbow, reachable by dialing (408) SEE-6809. It's on 24-hours a day out of Silicon Valley in Sunnyvale, CA. Our congrats to the SYSOP, Shawn Jipp, for getting *the* most original BBS phone number in the country.

* * * * * *

EDUCATORS SHOULD TAKE NOTE of a series of workshops on the topic Microcomputers in Education to be held in a number of locations this winter. The workshops are designed for professional development for all educators at all levels, elementary through post-secondary. Locations and dates are: St. Louis, Dec. 7-9; Boulder, CO, Dec. 13-15; Tallahassee, FL, Jan. 18-20; Washington, Feb. 7-9; and New York, Feb. 17-19. Further information can be secured by writing TERC, 8 Eliot Street, Cambridge, MA 02138.

* * * * * *

WHAT'S AN ANTECO, we've been asked. You may be interested to know that Anteco is at the center of one of the newest marketing projects involving CoCo, the sale of software and firmware through dealers at the retail level. Dick Hatcher, the head of the computer project (and a fellow CoCo owner), plans to have several hundred (and maybe thousand) retailers nationwide who will support the 80C and TDP-100.

* * * * * *

ANOTHER "BIGGIE" IS NEWS that there soon will be a "Software Club" springing up to handle programs for the CoCo. It is backed by a big outfit, the name of which we are not at this time at liberty to disclose. But, this is just growing evidence of the widebased support for 80C.

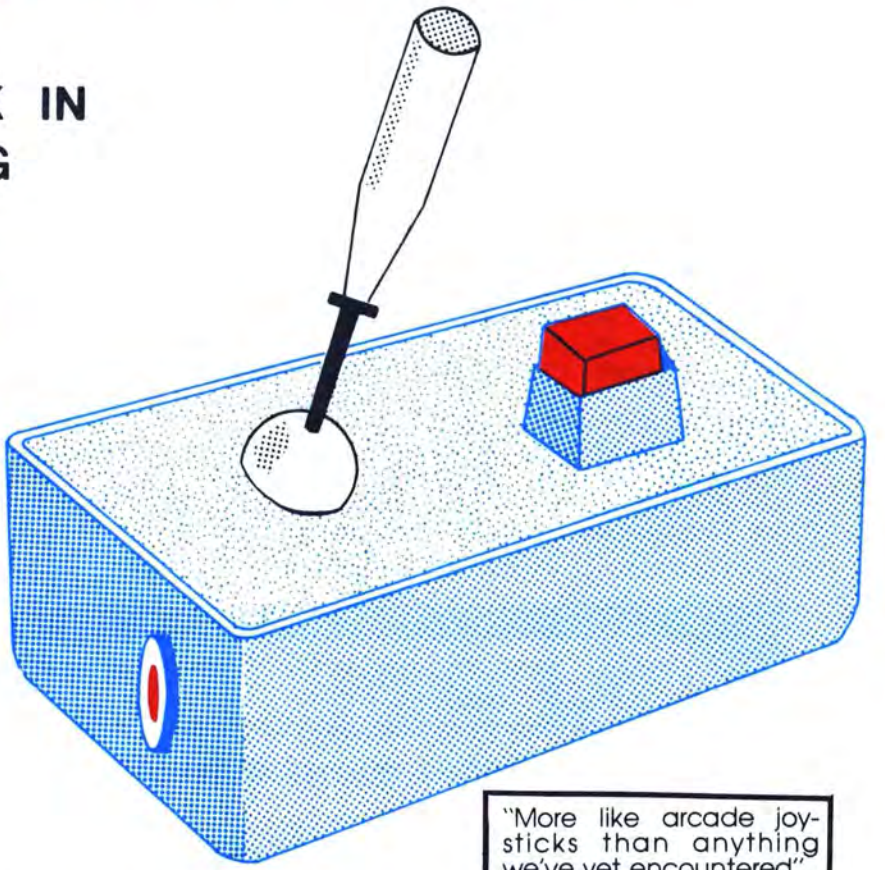
* * * * * *

RAINBOWfest IS A BIG show planned for the spring in Chicago. It will bring together the best of everything that is available for the 80C and TDP-100 in one place for the very first time. Sponsored by *the Rainbow*, RAINBOWfest should be a lot of fun for everyone (*if* there are non-computerists in your family, the shopping, zoo, aquarium and museums in Chicago are fantastic)! There will be more details in the future, so watch for them.

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RAINBOW CERTIFICATION SEAL

Graphics—Tutorial...

Shades of PMODES 1 and 2 Gives You Even More Colors

By H. Allen Curtis

Reading the title, you might get the impression that this article concerns ghosts. In a sense, it does. It concerns a type of ghost somewhat like the television secondary-image ghosts. The secondary images are actually *shades* of color different from those in the two color sets of either PMODE 1 or PMODE 3.

The objective of this article is to provide a logical explanation of the frequent and surprising occurrences of spectra of colors in CoCo graphics displays. A few very short programs will be used in pursuing this objective. The reader should find it beneficial to key in and run the programs as they are discussed. PMODE 3 is used throughout the programs, but the pertinent results are the same using PMODE 1.

The following program serves as a starting point in the search for the explanation of PMODE 3 ghosts:

```
10 PCLEAR4: PMODE3: PCLS
20 FORS=0TOL: SCREEN1,S
30 FORC=2TO4: PCLSC
40 FORD=1TO1000: NEXT: NEXT: NEXT: GOTO10
```

The program simply clears the screen successively to the colors yellow, blue and red against a green background and then cyan, magenta and orange against a buff background. In each of these displays of two colors of the sets 0 and 1 of PMODE 3, one can observe ghosts at the extreme left and right of the non-background colored rectangle.

The ghosts are most evident for the red rectangle against the green background and the magenta rectangle against the buff background. In all displays, the ghosts appear only at the left and right extremities of the non-background colored rectangles. There are no ghosts elsewhere.

These observations lead to the following conjecture: The color of a dot on the screen influences the color of its nearest neighbors to the left and right. In particular, if two neighboring dots have been specified in a program to be of *different* colors in one of the color sets of PMODE 3, then each of those dots will be displayed as ghosts, that is, as two different shades of color not in the given color set.

Toward verifying this conjecture, consider the following program:

```
10 PCLEAR4: PMODE3: PCLS: SCREEN1, 1
20 DRAW"C3BM8, 10D20BM20, 20R20"
30 GOTO30
```

This program draws two magenta lines on a buff background. The horizontal line, except for its extremities, is indeed colored magenta. However, the vertical line appears as two adjacent vertical lines, the left one colored pink and the right violet. Thus, buff and magenta have mixed to yield the pink and violet ghosts.

In line 10 of the current program, change *PCLS* to *PCLS2* and run the program again. Now, the "magenta" vertical line has produced ghosts which are light and dark shades of blue. Changing the background and foreground colors for all two-color combinations, from the color sets 0 and 1 of PMODE 3, yields analogous results.

To show that ghosts appear for slanted lines as well as

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vertical ones, consider the following programs:

```
10 PCLEAR4: PMODE3: PCLS: SCREEN 1,1
20 LINE(20,30)—(30,70),PSET
30 GOTO30
```

This program is supposed to draw a slanted orange line on a buff background. When the program is run, it is found instead that two adjacent slanting lines are produced, the left one being yellow and the right dark orange. The specified slanted line is split into six vertical line components each of which has its ghosts.

Curves drawn on the screen in PMODE3 are made up of horizontal and vertical straight line components. This fact is illustrated by the following program:

```
10 PCLEAR4: PMODE3: PCLS: SCREEN1,1
20 CIRCLE(128,96),70,,,33
30 CIRCLE(128,96),30,3,3
40 GOTO40
```

This program draws two intersecting ellipses, the first in orange and the second in magenta. The latter ellipse has more vertical straight line components; hence, its pink and violet ghosts are more prominent than the yellow and dark orange ghosts of the orange ellipse.

The programs presented in this article do not constitute *formal* proof of the proposed conjecture. However, they should provide sufficient evidence to convince most readers of the validity of the conjecture. The conjecture explains why PMODE 3 drawings consisting of a variety of linear and curvilinear objects present the viewer with such colorful displays. That is, the ghosts of the vertical straight line components of the drawn objects are responsible for the inclusion of the many extra colors that enhance the displays.

It is hoped that the information contained in this article will help Color Computer programmers to contrive even more colorful graphics.

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Education...

FoneHome—E.T. Could Have Used This One!

16K ECB

By Susan P. Davis

Certainly, most everyone knows that E.T., the Extraterrestal, spent quite a bit of time trying to phone home. But, even if some of your kids seem like they're from outer space, it's good for them to learn how to call home when they need to do so.

In short, it is desirable to teach your children their own telephone number. That's what I set out to do and that is how the following progra n, *FONEHOME* came to be.

One of the reasons people invest in a personal computer is because "it's educational for the kids." There is an adequate amount of educational software available for the elementary and secondary school-aged child and we at Sugar Software had already written *Silly Syntax* and promoted it as "an educational game for all ages."

But what about educational software for the preschool child?

! had been trying, unsuccessfully, to teach our then 3½-year-old son our telephone number. He was able, but unwilling, to learn it. So, it became a challenge. How can we motivate this child to learn his phone number? Finally, I was inspired. I made a song out of it, singing the numbers to the tune of "London Bridge Is Falling Down."

He was interested in the computer, so we used the phone number theme as his introduction to the computer. We wrote the following program, and had our son learn these skills:

(1) To type the word *RUN* (which he spells aloud "R-U-N—Enter"

(2) To type his name in order to get the program to continue

(3) Not to press the *break* key. This is hard for young children because it is red and the most enticing key on the keyboard.

Once he accomplished these skills, the computer provided an immediate reward: The "Phone Number" song in music, numbers and words.

FONEHOME is simple to personalize for any child. We have used it successfully with the preschool population of our neighborhood.

As simple as this seems, it accomplished far more than the long sought-after goal of teaching our son his phone number. He learned that he can sit down comfortably in front of a computer and give it instructions. Lots of middle-aged businessmen are still struggling with this concept.

The Listing:

```
10 '  P H O N E   N U M B E R
20 '
30 '  (C) 1982 By Sugar Software
40 '    Written by Gary Davis
50 '         2153 Leah Lane
60 ' Reynoldsburg, Ohio  43068
70 '          (614) 861-0565
80 '
90 P$="8610565":'  Assign phone
number
100 N$="JEREMY":'   Assign name
110 CLS 3
120 PRINT @71," ENTER YOUR NAME:
 ";
130 PRINT @208-LEN(N$)/2,"";
140 FOR I=1 TO LEN(N$)+1
150 A$=INKEY$:IF A$="" GOTO 150
160 IF ASC(A$)=12 GOTO 90:' Rest
art if CLEAR key
170 IF ASC(A$)<>13 GOTO 210:' EN
TER key hit
180 IF I=LEN(N$)+1 GOTO 330
190 SOUND 1,10
200 GOTO 150
210 PRINT A$;
220 IF A$=MID$(N$,I,1) GOTO 280
230 ' Incorrect letter entered
240 SOUND 1,10
250 PRINT CHR$(8);
260 GOTO 150
270 ' Correct letter entered
280 SOUND RND(50)+50,1
290 SOUND RND(50)+200,1
300 SOUND RND(50)+100,1
310 NEXT I
320 ' Entire name entered correc
tly
330 CLS 2
340 PRINT @48-LEN(N$)/2,N$;
350 PRINT @96,STRING$(32,CHR$(18
5));
360 PRINT @416,STRING$(32,CHR$(2
46));
370 GOSUB 650
380 A1$="EFG":GOSUB 540
```


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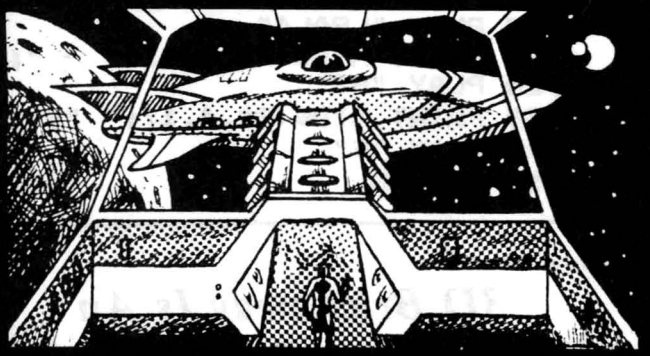
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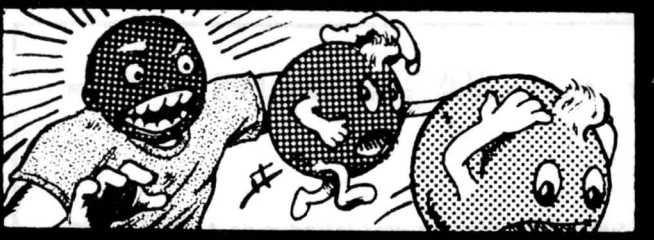
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```
390 A1$="DEF":GOSUB 540
400 A1$="EFG":GOSUB 540
410 GOSUB 650
420 GOSUB 540
430 PRINT @264,"MY ";
440 PLAY "L2D"
450 PRINT "PHONE ";
460 PLAY "G"
470 PRINT "NUM-";
480 PLAY "L4EL2"
490 PRINT @276,"BER";
500 PLAY "C"
510 A$=INKEY$:IF A$="" GOTO 510
520 CLS
530 END
540 PRINT @178,"      ";
550 FOR I=1 TO 30:NEXT I
560 PRINT @178,MID$(P$,5,1);" ";
570 PLAY LEFT$(A1$,1)
580 PRINT MID$(P$,6,1);" ";
590 PLAY MID$(A1$,2,1)
600 PRINT MID$(P$,7,1);
610 PLAY "L2"
620 PLAY RIGHT$(A1$,1)
630 PLAY "L4"
640 RETURN
650 PRINT @168,STRING$(15," ");
660 FOR I=1 TO 30:NEXT I
670 PRINT @168,MID$(P$,1,1);" ";
680 PLAY "G"
690 PRINT MID$(P$,2,1);" ";
700 PLAY "L8AL4"
710 PRINT MID$(P$,3,1);" - ";
720 PLAY "G"
730 PRINT MID$(P$,4,1);" ";
740 PLAY "F"
750 RETURN
```


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Software Review...

3D Brickaway Is An Outstanding Game Offering

The truth of the matter is that, when we saw the instructions, we thought "Oh no, not another *Breakout*-type game.

We were not too impressed with *Brickaway* from this same author (Britt Monk, CDP) in an earlier review. But, we think *3D Brickaway* is as super as *Brickaway* was dull.

This one is a hit. The "bricks" you need to knock out of the wall are at one end of a four-sided corridor and your paddle is at the other end. Using the joysticks, you bounce your ball down the corridor and into the wall, knocking out the bricks one at a time.

But, very unlike any other *Breakaway* game we have seen, the ball comes back at you from the wall in true 3D perspective. And, if it hits any of the walls on the way back, it bounces off that wall and, oftentimes, into another.

Written entirely in machine language, this game is fast and requires you to be accurage. The paddle, which is right in front of you at the "open end" of the screen is transparent so you can see the ball coming. The paddle is also segmented—so there is a "sweet spot" as well as a lot of angles at which the ball can bounce.

We honestly believe Mr. Monk should have named this one 3D Handball rather than 3d Brickaway. The effect is similar to a handball court with a ceiling and no back wall. It is a great deal of fun to play and difficult to master. The 3D perspective is very life-like.

Yes, we have a complaint. But only one. After each game, is over, *3D Brickaway* plays a little tune, not once but two times. When you have been vanquished you really want to get back to it and we wish the "wait" were a little less long. But the play of the game itself is teriffic and, while it takes excellent eye-hand coordination to do well, we think you will vastly enjoy this outstanding offering. And, at $14, it is a bargain as well!

(Britt Monk CDP, P.O. Box 802, Elyria, OH 44036, $14)

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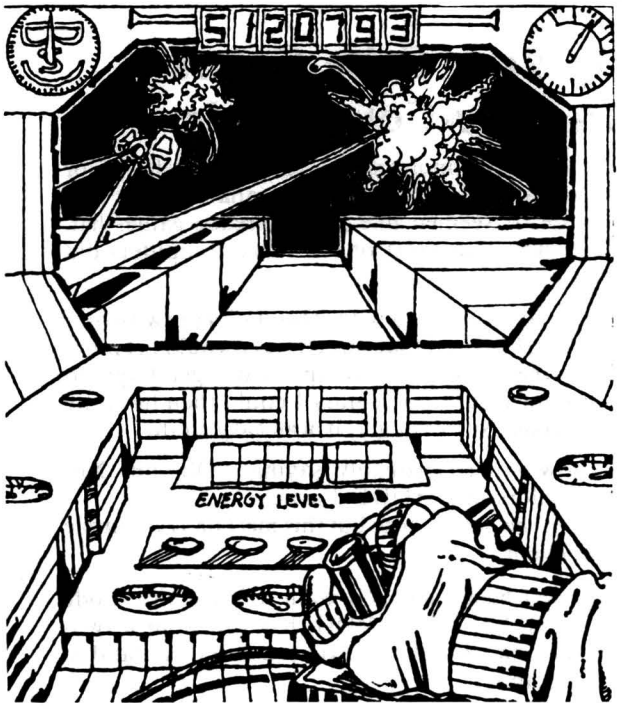
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Graphics? Here Are Two . . . By George !

By George Ziniewicz

*(Mr. Ziniewicz, the author of the **Colorkit** for Arizin, contributes these two offerings for our graphics issue.)*

Here Are Some Very Neatly Done Polygons

16K ECB

One of the early programs to which readers of *the Rainbow* took a fancy was *POLYGON*, which was published almost a year ago this month. Various enhancements were published for it in the following months.

This program, which I called *THE SHRINK* is a little bit different. And, as you will see, you can get some very nicely done patters with it.

The program is essentially self-prompting. Just CLOAD it and RUN. Answer the prompts and you may be surprised by the result.

```
1 'THE SHRINK
2 'BY GEORGE ZINIEWICZ
3 'ARIZIN SOFTWARE
10 PM=3:CS=4:PC=-1:FC=2:C=2:BC=1
30 CLS:PRINT "THE SHRINK"
31 PRINT "THIS PROGRAM WILL DRAW
 AN N        SIDED POLYGON, THEN
SHRINK OR    ROTATE THE POLYGON A
CCORDING     TO YOUR INSTRUCTIONS
."
35 PRINT "DEPRESS THE SPACE BAR
TO START     OVER WHEN FINISHED O
R KEY A TOABORT."
50 FS=90:SX=80:SY=SX:ND=360
60 R=57.2957796:TX=128:TY=96:N0=
0:N1=1:N2=2:N5=5:N8=8:N9=9
100 PRINT
110 INPUT "INPUT NUMBER OF SIDES
";P
120 AP=ND/P: 'ANGLE OF POINT
130 INPUT "INPUT NUMBER OF POLYG
ONS";G
140 SS=FS/G: 'SCALE OF STEP
150 INPUT "INPUT DEGREE OF SPIRA
L";ID: ' INCREMENT DEGREE
160 PCLS:GOSUB987
190 DG=0: ' STARTING ANGLE
200 FOR SX=FS TO N1 STEP-SS:C=2
300 FOR RA=N1 TO P+N1:COLOR C
310 A=DG/R:X=SIN(A)*SX+TX:Y=-COS
(A)*SX+TY
340 IF RA=N1 THEN LINE(X,Y)-(X,Y
),PSET ELSE LINE -(X,Y),PSET
350 C=C+N1:IF C=BC THEN 350 ELSE
 IF C=N5 THEN C=N2
360 DG=DG+AP:NEXT:DG=DG+ID-AP:IF
 INKEY$<>"A" THEN NEXT ELSE SX=N
1:NEXT:GOTO100
400 IF INKEY$="" THEN 400 ELSE 1
00
987 PMODEPM:IFPC THEN SCREEN 1:P
OKE 65314,240+2*CS:RETURN ELSE S
CREEN1,CS/4 RETURN
```

Fly Your False Colors In Four-Color Mode

One of the early disappointments I had about the Color Computer was its lack of black as an available color in a four-color mode. It seemed like all the arcade games had black backgrounds, and most of the other computers did too, but not CoCo.

While I was playing around with PMODE 4 (a two-color mode with black), I noticed that sometimes I would get more colors than just the white dot I was supposed to get. I figured if I could get control of these colors I could then have my black backgrounds. Surprisingly, it was easy to do.

Now, I know you're probably saying, "Oh, no! Not another extra-colors-in-PMODE-4 article."

Well, I've seen the others, too; but this method is so simple you won't believe it.

You simply tell basic that you want a four-color mode (PMODE 1 or 3), but tell the VDG that you want a two-color mode. All it takes is the addition of one command in your basic program!

Just follow any SCREEN Command with:

POKE 65314,240 color set 0 (mostly greenish) orPOKE 65314,248 color set 1 (best mode)

Now, you can use all of the available commands like PSET, LINE, DRAW, CIRCLE, PCLS, etc. without modification, and have, in effect, two new color sets to display.

The available colors are:

COLOR SET 0

1. **BLACK**
2. **DARK RED***
3. **DARK GREEN***
4. **LIGHT GREEN**

COLOR SET 1

1. **BLACK**
2. **RED***
3. **GREEN***
4. **WHITE**

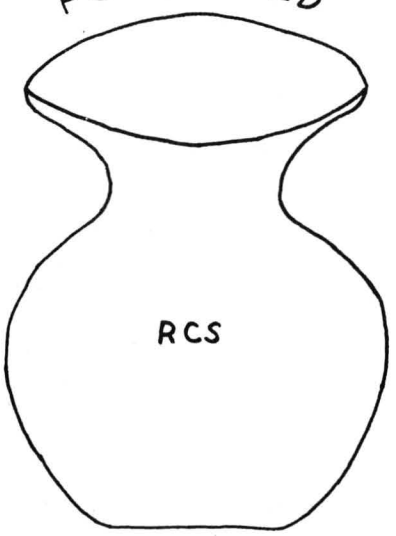
NOTE: The colors noted by the asterisk (*) are *pseudocolors*, an artificial by-product, and as such may not appear where indicated. In other words, depending on the phase of the computer and the phase of the TV (and the phase of the moon?), color 2 may be green and 3 red. It depends on how the computer was 'booted.' But, once the system is turned on, it will remain constant. So, if you find that color 2 is red, then color 2 will always be red, unless you hit RESET or turn off your computer, in which case the colors may reverse.

To accurately control the colors, use variables in place of explicit numbers for the color values in the COLOR, PSET, etc., commands (I use H1=1: H2=2: H3=3: H4=4). Then, if you intended in your program for H2 to be red in a PSET (X, Y, H2), for example, but find it's blue, simply redefine the variables (H2=3: H3=2).

Because of variations in TV color-killer circuits, and in CoCo itself, pseudocolors may not appear on all TVs; but

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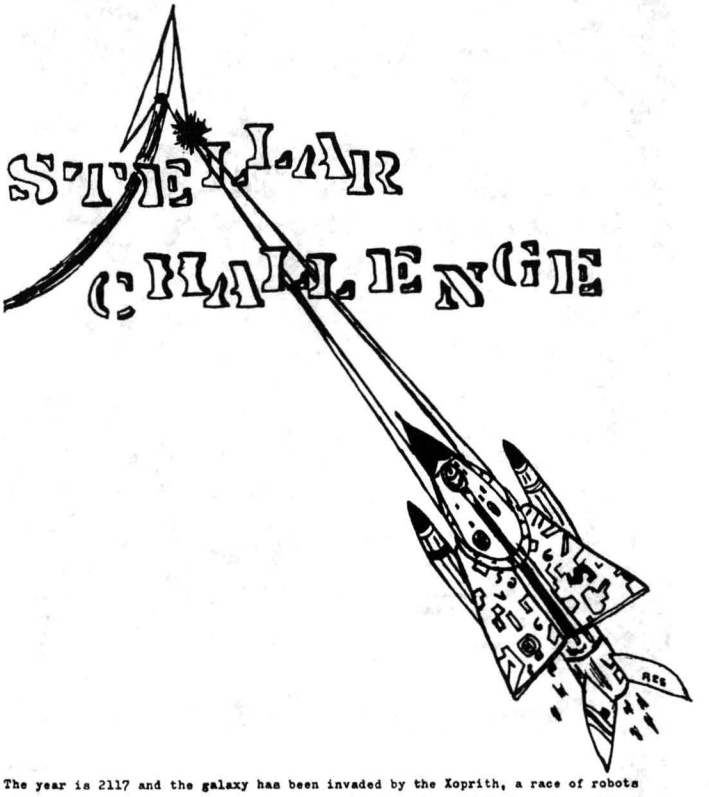


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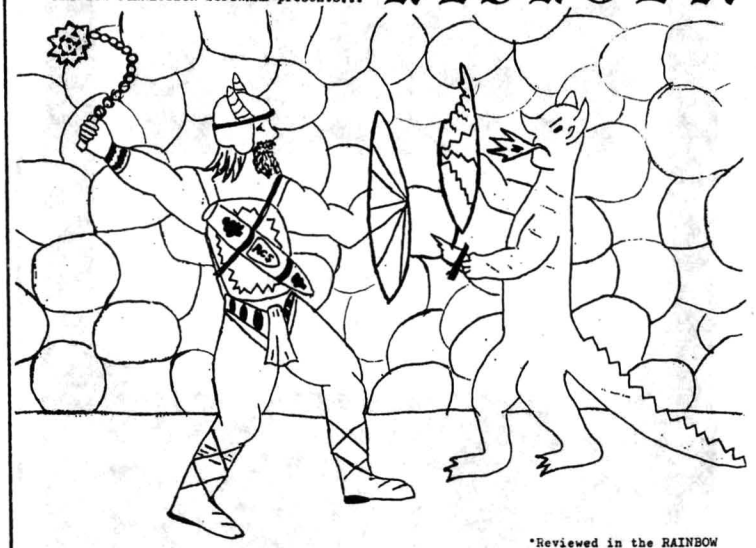
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this is quite rare. This also will not work on systems that are rigged for direct drive of the color guns in the TV. However, this is a rare user modification.

These new color sets are valid with both PMODE 1 and 3, with the POKE being the same for both modes.

As an example, let's say we want a mode with 128 by 96 resolution, and pseudocolor set 1. We would use the following Basic command string in a program:

PMODE1:SCREEN1:POKE65314,24B

(The color set parameter in the SCREEN command is not necessary if you use the POKE, but won't hurt either).

That will give us black, (red/green), and white.

Dig out your favorite Graphics program, stick in one POKE, then RUN. That's all there is to it!

If you want to stick with PMODE4 for the highest resolution available, you can use the pseudocolor effect to give you four different color backgrounds in the two-color PMODE4 by using the following command string whenever you clear the screen:

PMODE3:PCLS(color):PMODE4

The PMODE3 lets Basic PCLS in one of four colors, while the PMODE4 resets the system to highest resolution mode.

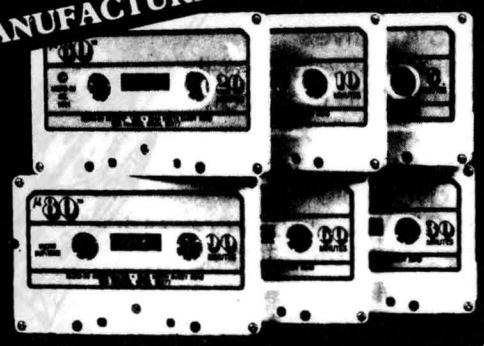
As Edison said, "Who cares why it works, let's just use it!"

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Hardware Review...

This Switcher Will Make Things Much Easier For You

One of the major bonuses of the 80C is the addition (at no extra cost) of an RS-232 interface for hooking up a printer, modem or whatever. The problem is that there is only one of them (we can be greedy, can't we?)

That is simply because there are at least two perpherials many CoCo owners want to include with their setup—both a printer *and* a modem. This is especially important if you want to make hard copy of communications with data bases such as Connection-80 or CompuServe.

Up until now, your only choice in matters such as this was to plug in the modem, capture information, and then unplug the modem and plug in the printer. That's a lot of plugging. With the *RS-232 Switcher*, all that plugging is eliminated.

Available in two versions—one with two outputs and the other with three, the *RS-232 Switcher* allows you to use a dial to choose which perpherial you want "on line." That's all there is to it.

This little item works like a charm! And, for those who have something else they want to use the RS-232 port for, the three-position version is outstanding, too.

Here at *the Rainbow*, we have two printers and a modem hooked up to each of two Color Computers. By merely selecting which printer we want to use, we can send output from *either* computer to *either* printer.

This setup has been working for a couple of months now without a single hitch. We can recommend the *RS-232 Switcher* most highly.

(DSL Computer Products, P.O. Box 1113, Dearborn, MI 48121, $39.95 for three plug model; $29.95 for two plug plus $1 s/h)

Submitting Material To the Rainbow

Contributions to *the RAINBOW* are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary, explaining how the program works. We're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, *the RAINBOW*, P.O. Box 209, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

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*TRS-80 is a trademark of Tandy Corp.

Auto Run
Auto Run is a utility program for the TRS-80* Extended Basic Color Computer. It is used to add convenience and professionalism to your software.

Auto Run will create a tape which will consist of a machine language loader followed by your Basic or machine language program. With this tape, a simple CLOADM command will load and start the loader which will load and start your program. You may design a title screen with the graphics editor which will display as your program loads. Also you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above $600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

Auto Run is $14.95 and includes complete documentation and an assembly source listing.

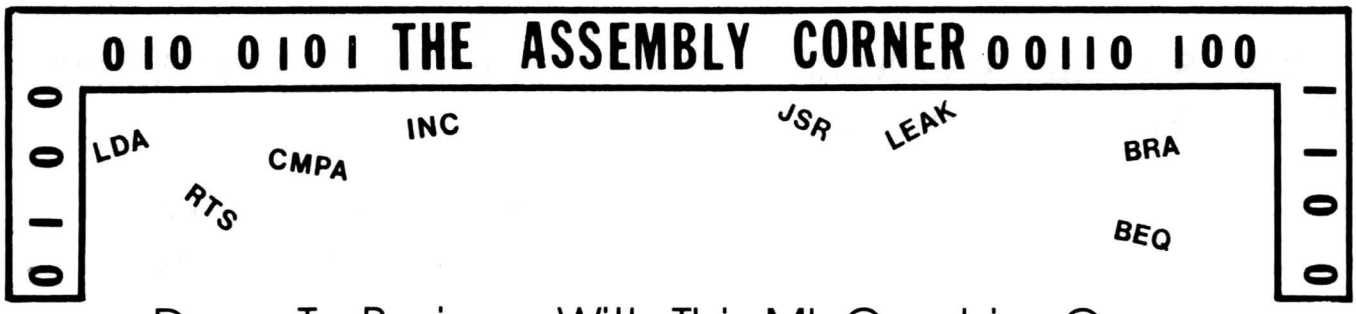
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Down To Business With This ML Graphics Game

By Dennis S. Lewandowski
***Rainbow* Contributing Editor**

(Mr. Lewandowski, an experienced assembly language programmer and teacher, is president of DSL Computer Products.)

If you chose to play with last month's program, *good* for you. You may have noticed that I picked a graphic screen that is not available in Basics PMODE commands. The reason is to show that there is a lot more to the 80C than meets the eye. As promised last month we are going to put something on the screen. Since everyone like shoot-em-ups, I thought we would start with a BASE. From the listing you will notice we took some of the first lines from last month's program, to generate the graphic screen. We also borrowed BACK from last month, to return to Basic when we're done.

Let's look at this listing starting at line 20. Here we are defining a variable. Loading the X register with $19AE, and storing it at NEWPL, or NEW PLACE. This is the starting position of the BASE. Then the Y register is loaded with the BASE graphic address. Followed by a branch to subroutine called DRBS, or DRAW BASE. This is a routine similar to OUTA in previous programs in that it outputs the contents of the A register to the memory location which the X register is pointing at. However, we cannot use the control codes we used in the normal 80C screen, so we'll make them up as we go. (A control code is a character that when printed on the normal screen performs a function other than displaying a character. Such as $0D = Carriage Return.)

The first order of business in DRBS is to find the current location of the base. Back in line 21 we decided the start position, but what if we want it to move? The X register is loaded with the contents of NEWPL. (Remember, we loaded the Y register with the BASE graphic location in line 22.) Now we load the A register with the contents of the memory location that Y is pointing at, and automatically

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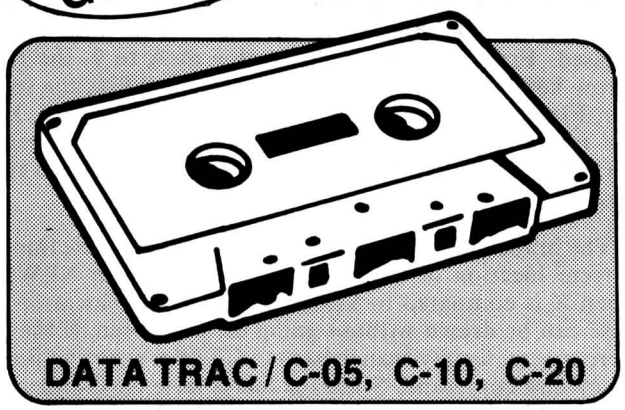
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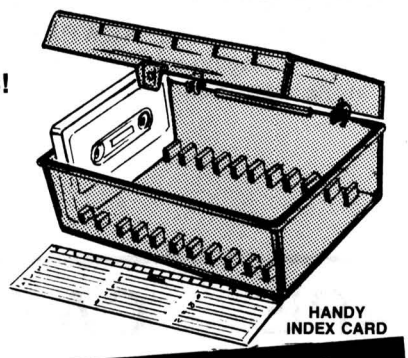
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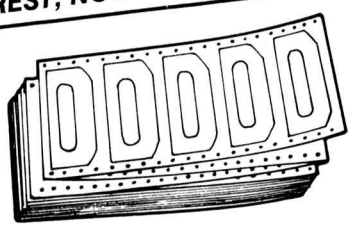
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increment Y to the next memory location. (Isn't that indexed addressing? YUP!) Here comes the fun part, first we compare the A register to a zero. Why? Zero is the value we used to clear the screen, so if A contains a zero, and we called this routine, we must want to erase something. So if A contains zero we allow it to pass by branching to OK. But A contains $80, so this test is false and we compare A to one. One is our end of graphic marker, if A contained one we would branch to DONE. Since this test is also false, we compare A to $20. This may be a little confusing, but a value greater than one, and less than $20 (32), will be treated as an offset. Again, this test is false so we fall through to OK, in line 33. Here the contents of A are stored in the memory location which X is pointing at. The last instruction of our loop is a branch always back to LOOP, to get the next graphic byte.

The next graphic byte isn't! The next byte of BASE is $1E. Going to line 31, we see that when A is compared to #20 , it will meet the Branch if LOwer (BLD) requirements. And we are going to branch to OFFSET, line 36. I'll explain why I chose $20 (32) as the offset value. Each graphic "block" on the graphic screen is actually four "pixels" by one. The value stored into the memory locations which are displayed will decide which pixel will be lit, and the color it will be lit with. (Actually even when we did PCLS, we lit all the pixels, with the color green.) Referring to Figure 3, in last month's article, you will see the screen is 128 X 96 in size. Or 128 pixels high, and 96 pixels wide. Since each memory location controls four pixels in width, it is safe to deduce (96/4 = 32) that each graphic line consists of 32 memory locations. By choosing $20 for an offset, we can in effect perform a line feed for a graphic screen.

Back to the program, OFFSET in particular. The first item is to get the contents of A into the B register. The reason, a beautiful instruction called ABX, which stands for ADD B to X. As I mentioned in a previous article, only the A, B or D registers are designed to have math done in them. However, there is this one instruction which allows the contents of B to be added to the X register. It seems to fit our needs, so we use it in line 37. Now X, our screen pointer, is pointing at a memory location one line down from where we stored our first graphic. To continue drawing the base we branch to LOOP, and get the next graphic.

Once the base is drawn, we return from the subroutine to line 24. Here we branch always to GETKEY, and see what is going on at the keyboard. We continue to scan until a key is pressed. First we compare the value of A to 9, the right arrow key. Next 8, the left arrow key. Then $20, the space bar. Finally $58, the X, our escape key. If any of these keys are pressed we would branch to MOVRT, move right, MOVLF, move left, FIRE, or BACK. Let's pick the right arrow.

The branch takes us to MOVRT, line 56. Here we find the current location of the base by loading X with NEWPL. Then X is compared to $19BF, the rightmost location the base can be drawn without going off the screen. If the test were true we simply branch back to GETKEY, as that is now an invalid command. Since the test is false we fall through and load Y with the address of CLNUP, then we branch to DRBS. Clean Up contains just zeros, and offsets, so the present base will be erased. The Least Significant Byte of NEWPL is incremented, NEWPL+1, and the new value is loaded into X. Again we branch to DRBS, and redraw the base at its new location. Almost the same happens in

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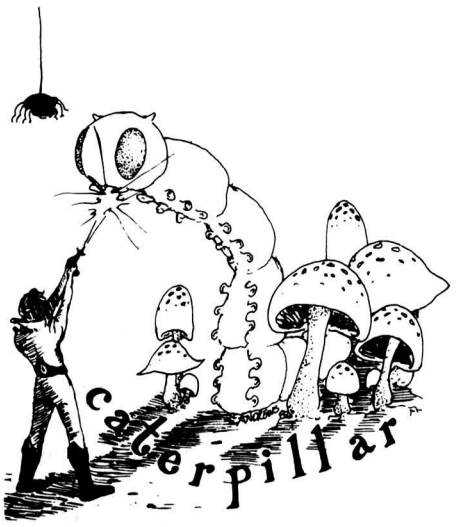
QUEST – A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16k TRS-80, TRS-80 Color, and Sinclair. 13K VIC-20. $14.95 each.



ADVENTURES!!!

These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16k on TRS80, TRS80 color, and Sinclair. They require 8k on OSI and 13k on Vic-20. Derelict takes 12k on OSI. $14.95 each.



CATERPILLAR

O.K., the Caterpillar does look a lot like a Centipede. We have spiders, falling fleas, monsters traipsing across the screen, poison mushrooms, and a lot of other familiar stuff. COLOR 80 requires 16k and Joysticks. This is Edson's best game to date. $19.95 for TRS 80 COLOR.

PROGRAMMERS!
SEE YOUR PROGRAM IN THIS SPACE!!

Aardvark traditionally pays the highest commissions in the industry and gives programs the widest possible coverage. Quality is the keyword. If your program is good and you want it presented by the best, send it to Aardvark.

ESCAPE FROM MARS
(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

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It's a real adventure—with ghosts and ghouls and goblins and treasures and problems – but it is for kids. Designed for the 8 to 12 year old population and those who haven't tried Adventure before and want to start out real easy.

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(by Rodger Olsen & Bob Anderson)

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TUBE FRENZY
(by Dave Edson)

This is an almost indescribably fast action arcade game. It has fast action, an all new concept in play, simple rules, and 63 levels of difficulty. All machine code, requires Joysticks. Another great game by Dave Edson. TRS 80 COLOR ONLY. 16k and Joysticks required. $19.95.



CATCH'EM
(by Dave Edson)

One of our simplest, fastest, funnest, all machine code arcade games. Raindrops and an incredibe variety of other things come falling down on your head. Use the Joysticks to Catch'em. It's a BALL! – and a flying saucer! – and a Flying Y!– and so on. TRS 80 COLOR. $19.95.

BASIC THAT ZOOOMMS!!
AT LAST AN AFFORDABLE COMPILER!

The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

It does have some limitations. It takes at least 8k of RAM to run the compiler and it does only support a subset of BASIC– about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, *, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.

TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20-page manual and can be modified or augmented by the user. $24.95 on tape or disk for OSI, TRS-80 Color, or VIC.

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MOVLF, except that NEWPL is decremented, and the base is moved to the left.

How about FIRE. Right now there is nothing to shoot at. Pressing the space bar will branch to FIRE. This time the D register is loaded with NEWPL, the base position. Why not X, rather than D. Sorry, only a ABX instruction exists, we need to subtract, and as you will see we are going to do quite a bit of register swapping due to this. For right now we are forming a closed loop to get the shot to the top of the screen. We subtract $20, or one line, from D. Then check for the top of the screen. Now the swapping, transfer D into X, load A with $80, and store it on the screen. Remember, D is really A and B combined. Now so you can see the shot if you look real fast we decrement A, or subtract 1, until the $80 we loaded it with becomes a zero. This is LOOP2. Again we have to switch X and D, so the shot will reach the top of the screen. Then branch to LOOP1, and do it all again.

If the X key is pressed we escape back to Basic, which is where I'll leave you until next month.

The Listing:

```
0001 0600                NAM BASE
0002 0600          HYRES EQU $E00
0003 0600          VAR   EQU $300
0004 0600          NEWPL EQU $302
0005 0600          SHOT  EQU $B0
0006 0600                ORG $1A00
0007 1A00 86C0     START LDA #$C0      MEDIUM GRAFICS
0008 1A02 B7FF22         STA $FF22     SET CONTROL
0009 1A05 B7FFC7         STA $FFC7     MOVE SCREEN UP
0010 1A08 B7FFC9         STA $FFC9     INTO HIGH MEM
0011 1A0B B7FFCB         STA $FFCB     FOR DISK USERS
0012 1A0E B7FFC5         STA $FFC5     SET VDG
0013 1A11 CC0000   SCREN  LDD #0        PUT 0 IN D
0014 1A14 B70300         STA VAR       PUT 0 IN VAR
0015 1A17 8E0E00         LDX #HYRES    PUT START IN X
0016 1A1A ED81     PCLS  STD ,X++      DOUBLE TIME
0017 1A1C 8C1A00         CMPX #$1A00   END OF SCRN
0018 1A1F 26F9           BNE PCLS      CLEAR THAT SCRN
0019 1A21 8E19AE         LDX #$19AE    START POS'IN
0020 1A24 BF0302         STX NEWPL     SAVE LOCATION
0021 1A27 108E1A4A       LDY #BASE     GET BASE GRAFIC
0022 1A2B 8D02           BSR DRBS      DRAW BASE
0023 1A2D 202B           BRA GETKEY    GET INPUT
0024 1A2F BE0302   DRBS  LDX NEWPL     GET BASE POS'IN
0025 1A32 A6A0     LOOP  LDA ,Y+       PUT GRAFIC IN A
0026 1A34 8100           CMPA #0       CLS GRAPHIC
0027 1A36 2708           BEQ OK        LET IT PASS
0028 1A38 8101           CMPA #1       ARE WE DONE
0029 1A3A 2708           BEQ DONE
0030 1A3C 8120           CMPA #$20     IS IT OFFSET
0031 1A3E 2505           BLO OFFSET    THEN DOIT
0032 1A40 A780     OK    STA ,X+       IF NOT DISPLAY IT
0033 1A42 20EE           BRA LOOP      NEXT GRAPHIC
0034 1A44 39       DONE  RTS           RETURN
0035 1A45 1F89     OFFSET TFR A,B      SWITCH A WITH B
0036 1A47 3A             ABX           ADD B & X
0037 1A48 20E8           BRA LOOP      CONTINUE
0038 1A4A 801E     BASE  FCB $80,$1E   TOP & OFFSET
0039 1A4C 2AAA1E         FCB $2A,$AA,$1E  MIDDLE
0040 1A4F 2AAA01         FCB $2A,$AA,1    BOTTOM
0041 1A52 001E     CLNUP FCB 0,$1E     TOP
0042 1A54 00001E         FCB 0,0,$1E   MIDDLE
0043 1A57 000001         FCB 0,0,1     BOTTOM
0044 1A5A BDA1C1   GETKEY JSR $A1C1    INKEY$
0045 1A5D 27FB           BEQ GETKEY
0046 1A5F 8109           CMPA #9       RT ARROW?
0047 1A61 270E           BEQ MOVRT     MOVE RIGHT
0048 1A63 8108           CMPA #8       LF ARROW?
0049 1A65 2726           BEQ MOVLF     MOVE LEFT
0050 1A67 8120           CMPA #$20     SPACE?
0051 1A69 273E           BEQ FIRE      SHOOT SHOT
0052 1A6B 8158           CMPA #$58     X?
0053 1A6D 2755           BEQ BACK      EXIT TO BASIC
0054 1A6F 20E9           BRA GETKEY    NONE OF ABOVE
0055 1A71 BE0302   MOVRT LDX NEWPL     GET CURRENT LOC
0056 1A74 8C19BF         CMPX #$19BF   RT LIMIT
0057 1A77 27E1           BEQ GETKEY    TO FAR
0058 1A79 108E1A52       LDY #CLNUP    BLANK GRAPHIC
0059 1A7D 8DB0           BSR DRBS      ERASE OLD POS'IN
0060 1A7F 7C0303         INC NEWPL+1   ONE PLACE
0061 1A82 BE0302         LDX NEWPL     GET POSITION
0062 1A85 108E1A4A       LDY #BASE     GET GRAPHIC
0063 1A89 8DA4           BSR DRBS      DISPLAY IT
0064 1A8B 20CD           BRA GETKEY    DONE
0065 1A8D BE0302   MOVLF LDX NEWPL     GET CURRENT LOC
0066 1A90 8C19A1         CMPX #$19A1   LF LIMIT
0067 1A93 27C5           BEQ GETKEY    TOO FAR
0068 1A95 108E1A52       LDY #CLNUP    BLANK BASE
0069 1A99 8D94           BSR DRBS      ERASE
0070 1A9B 7A0303         DEC NEWPL+1   ONE SPACE
0071 1A9E BE0302         LDX NEWPL     GET LOCATION
0072 1AA1 108E1A4A       LDY #BASE     GET GRAPHIC
0073 1AA5 8D88           BSR DRBS      DISPLAY
0074 1AA7 20B1           BRA GETKEY    DONE
0075 1AA9 FC0302   FIRE  LDD NEWPL     GET BASE LOC
0076 1AAC 8320     LOOP1 SUBD #$20     NEXT LINE UP
0077 1AAF 10830E00       CMPD #$0E00   TOP OF SCREEN
0078 1AB3 25A5           BLO GETKEY    BACK TO MAIN
0079 1AB5 1F01           TFR D,X       SWITCH X & D
0080 1AB7 8680           LDA #$80      SHOT GRAPHIC
0081 1AB9 A784           STA ,X        DISPLAY SHOT
0082 1ABB 4A       LOOP2 DECA          SMALL WAIT
0083 1ABC 26FD           BNE LOOP2     SO WE CAN SEE
0084 1ABE A784           STA ,X        CLEAN UP SHOT
0085 1AC0 1F10           TFR X,D       SWITCH BACK
0086 1AC2 20E8           BRA LOOP1     TO THE TOP
0087 1AC4 9A71     BACK  DEC $71       -1 RESTART VECTOR
0088 1AC6 7EA027         JMP $A027     BACK TO BASIC
0089 1AC9                END START
```

(Editor's Note: We did it to DSL—and you—again last month, and inadvertantly dropped some charts Dennis had prepared. They are included in this month's issue after the listing. Please accept our apologies.)

Action software from ILUME

STARS — $14.95

Educational and entertaining, STARS will create a dome of the night sky on your TV. Constellations, stars, and other naked eye objects are drawn using Extended Resolution graphics. Special horizon views show the planets after sunset. Detailed documentation.

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A unique, multi-purpose data storage system. DATAFILE is a sophisticated, non-formatted database with user defined catagories. It performs string searches, deletes, sorts (with ML subroutines) and prints in various formats. DATAFILE also works with files larger then available RAM! Ideal for name & address lists, cataloguing, etc. A surprise FREE file is included with each order. Complete documentation.

BLACKBOX — $69.95 each $125.00 for two

Now you can send your programs, machine language or basic, over the phone. And you don't need a modem!! Switch on BLACKBOX and when your load or save a program, you automatically have a copy at a friends house. Two BLACKBOX's are needed, one for each end of the connection.

SPIDER ATTACK — $14.95

Shoot-em up action! Now you can stop nasty invading spiders with your joystick controlled laser gun. Written in Extended Basic with machine language subroutines for fast action. Watch out you don't get eaten!

MILLBORN — $14.95

Like to play cards? From France, we bring you this popular card game for CoCo. The object of the game is to drive 700 miles, while avoiding accidents, tire blow-outs, detours, etc. Lots of fun!

COLORSHOW — $14.95

Music, Color and your CoCo! Just load in COLORSHOW, connect the 80C to your stereo (or simply put a musical tape in your recorder) and watch the fun. Having a party? Turn off the room lights, turn up the music and put on COLORSHOW. Works great with Rock 'n Roll!

DISKPRO — $29.95

No more crashed disks! This program can be your lifesaver. DISKPRO creates back-ups of your disk directory and allocation tables. A valuable tool to protect your software. Comes on disk with documentation.

Add $1.00 postage for all software, $2.00 postage for BLACKBOX. Programs available on disk for $5.00 extra.

ilume design

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Montreal, Quebec, Canada H2V 4J5

RAINBOW CERTIFICATION SEAL

BIT	RESET		SET	
0	65478	$FFC6	65479	$FFC7
1	65480	$FFC8	65481	$FFC9
2	65482	$FFCA	65483	$FFCB
3	65484	$FFCC	65485	$FFCD
4	65486	$FFCE	65487	$FFCF
5	65488	$FFD0	65489	$FFD1
6	65490	$FFD2	65491	$FFD3
VDG				
0	65472	$FFC0	65473	$FFC1
1	65474	$FFC2	65475	$FFC3
3	65476	$FFC4	65477	$FFC5

Figure 1

Figure 2

BIT 6 5 4 3 2 1 0	SCREEN LOCATION DECIMAL	HEX
0 0 0 0 0 0 0	00000	$0000
0 0 0 0 0 0 1	00512	$0200
0 0 0 0 0 1 0	01024	$0400
0 0 0 0 0 1 1	01536	$0600
0 0 0 0 1 0 0	02048	$0800
0 0 0 0 1 0 1	02560	$0A00
0 0 0 0 1 1 0	03072	$0C00
0 0 0 0 1 1 1	03584	$0E00
0 0 0 1 0 0 0	04096	$1000
0 0 0 1 0 0 1	04608	$1200
0 0 0 1 0 1 0	05120	$1400
0 0 0 1 0 1 1	05632	$1600
0 0 0 1 1 0 0	06144	$1800
0 0 0 1 1 0 1	06656	$1A00
0 0 0 1 1 1 0	07168	$1C00
0 0 0 1 1 1 1	07680	$1E00
0 0 1 0 0 0 0	08192	$2000
0 0 1 0 0 0 1	08704	$2200
0 0 1 0 0 1 0	09216	$2400
0 0 1 0 0 1 1	09728	$2600
0 0 1 0 1 0 0	10240	$2800
0 0 1 0 1 0 1	10752	$2A00
0 0 1 0 1 1 0	11264	$2C00
0 0 1 0 1 1 1	11776	$2E00
0 0 1 1 0 0 0	12288	$3000
0 0 1 1 0 0 1	12800	$3200
0 0 1 1 0 1 0	13312	$3400
0 0 1 1 0 1 1	13824	$3600
0 0 1 1 1 0 0	14336	$3800
0 0 1 1 1 0 1	14848	$3A00
0 0 1 1 1 1 0	15360	$3C00
0 0 1 1 1 1 1	15872	$3E00
0 1 0 0 0 0 0	16384	$4000

END OF FIRST 16K = $3FFF

Figure 3

VDG 2 1 0	CONTROL REGISTER 7 6 5 4 3 2 1 0	SCREEN SIZE	# OF BYTES	STA $FF22
0 0 0	0 0 0 0 0 1 0 1	NORMAL	512	$05
0 0 1	1 0 0 0 @ 0 0 0	64X64	1024	$80
0 0 1	1 0 0 1 @ 0 0 0	128X64	1024	$90
0 1 0	1 0 1 0 @ 0 0 0	128X64	2048	$A0
0 1 1	1 0 1 1 @ 0 0 0	128X96	1536	$B0
1 0 0	1 1 0 0 @ 0 0 0	128X96	3027	$C0
1 0 1	1 1 0 1 @ 0 0 0	128X192	3027	$D0
1 1 0	1 1 1 0 @ 0 0 0	128X192	6144	$E0
1 1 0	1 1 1 1 @ 0 0 0	256X192	6144	$F0

@ = 0 or 1, 0 gives one color set, 1 gives another. Just change LSB to 8. eg. $C8 instead of $C0.

TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer™. Devoted to SS-50 6800 and 6809 machines up to now. 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

NOTE: This and other interesting and needed articles for the Radio Shack TRS-80 color computer™ are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!

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68 Micro Journal™ was established with one objective in mind; to provide a Magazine **FOR** 68xx Users **BY** 68xx Users. Because of a strict advertiser policy, **68 Micro Journal™** has gained a strong following WORLDWIDE because the reader KNOWS what he is getting when purchasing from a **68 Micro Journal™** Advertiser. It has gained a strong User following because most of the material published is contributed BY USERS, and, therefore, is relevant to the Users needs.

Currently, and even before the Color Computer™ hit the stores, **68 Micro Journal™** was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer Magazine. Examples include:

REVIEWS of the three major Disk Control Systems for the Color Computer™, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc.

DISCUSSIONS of the 6883 Synchronous Address Multiplexer, using the Color Computer™ with 64K and 96K memory (which it is ALREADY capable of handling), thoughts on Programming, etc.

I suggest that you subscribe to **68 Micro Journal™**, SOON, as many back issues are sold-out.

We still, and will continue to, lead in the type information you need to **FULLY UTILIZE the POWER of the 6809 in the Radio Shack TRS-80 Color Computer™.**

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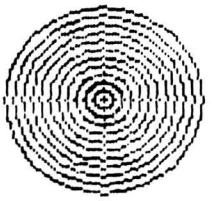
** Sample issue - $3.50

Bob Nay
Color Computer Editor

```
LIST

10 'EXAMPLE SCREEN DUMP USING SOLUTION
20 FORI=1TO355STEP3
30 CIRCLE(180,64),I
40 NEXT
50 FORI=32 TO 127
60 PRINTCHR$(I);" ";
70 NEXTI

OK
```



```
RUN
   ! " # $ % & ' ( ) * + , - . / 0 1 2 3 4
5 6 7 8 9 : ; < = > ? @ A B C D E F G H I
J K L M N O P Q R S T U V W X Y Z [ \ ] ↑
← ' a b c d e f g h i j k l m n o p q r s
t u v w x y z { | } ~ ■
OK
```

Congratulations

you made the right choice when you purchased a Color Computer. It is a very powerful machine. However the standard display format does not do the machine justice. The machine is capable of much more than 16 lines of 32 all capital characters. Now you can give your Color Computer the display it deserves. **THE SOLUTION** gives the Color Computer a much better display than it normally has, and really makes the machine shine. Its features include:

- provides a screen of **42 characters** by **21** lines displayed
- linked directly to basic — program is transparent to the user
- prints all 96 ASCII characters, lowercase characters have descenders, has a slashed **zero** to avoid confusion when programing
- prints characters on any two-color graphic screen
- graphics and text may be intermixed on the same screen
- special mode with 4 lines of text at the bottom of the screen (just like some other famous color machines) — great for working with graphics
- large character mode for small children or the visually impaired
- character set may be reversed
- written in machine language, program is relocatable
- fast — prints at over 600 characters per second
- works with both cassette and disk
- includes a 20 page manual with demo programs (a lunar lander program is included)

SOLUTION $14.95

GRAPH LABEL

Have you ever wanted to place characters on a graphic screen but couldn't find an easy way to do it. Well then **GRAPH LABEL** is for you. This program will enable you to place characters anywhere on a graphic screen. It will place any of 96 ASCII characters on the screen or you may create your own characters. It features a cursor that may be moved anywhere around the screen with out rubbing out what it goes over. Superscripts and subscripts may be used since the cursor may be moved vertically and horizontally in steps as small as one pixel. Lowercase characters have descenders. **GRAPH LABEL** is written in Basic and is therefore easy to modify. It may be used by itself or as a subroutine. **$8.95**

RAINBOW CERTIFICATION SEAL

EXTENDER

Still want more than 42 characters per line from your computer. Then the **EXTENDER** is for you. This program when used with **THE SOLUTION** will give a display of **51** characters per line by 21 lines displayed. Please include your program serial number when ordering. **$7.95**

PILOT is a language which enables people with little knowledge to write educational programs. The language uses simple one or two letter commands for program functions.

There are two versions of PILOT for the Color Computer that are available from us.

CC PILOT

A small version of the language that runs on all machines. Comes with a manual and demo programs. **$4.95**

SUPER PILOT

An enhanced version of Pilot for use with Extended Basic. Includes features for math, graphics, and sound. Has a feature that makes it easy to create flash card type drill programs. Programs are pseudo compiled for faster execution. Comes with as 24 page tutorial manual and demo programs. Sample program included on tape to get you started. **$12.95**

SCREEN PRINT PACKAGE

A package of 2 programs for use with the LPVII, LPVIII, DMP100, DMP200, DMP400, DMP500. The programs will print an image of what is on a graphic screen to the printer. Both programs work with all the standard PMODEs. The programs are written in machine language and may be moved anywhere in memory. The two programs are:

1) **SCREEN PRINT** — will produce a regular size print. The image may be located anywhere on a page.

2) **DOUBLE SIZE SCREEN PRINT** — this program will produce a full size image that will fill up a sheet of paper. The finished product is 8 by 6.5 inches in size. Your computer graphics look really good when they are printed out with this program. **$4.95**

DISCOUNT — order **10** or more programs (you may mix types) and you will receive a 30% discount on the order. **Dealer** discounts are also available.

All programs for 16K, 32K Extended Basic machines unless otherwise noted. All programs on cassette. Add $4.00 per order for disk.

SHIPPING — add $2.00 for orders less than $20.00. Shipping is **free** on orders of more than $20.00.
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Business...

Want Some Money? Send Out A Statement

16K ECB

By Ron Garrett

Sending out a statement can be a difficult experience. There are all those lines, boxes and the like. But, your chances of collecting money are a little better if your statement looks professional.

The following program, *Statement*, complements of the East Texas Color Computer Club, is designed for use with a "universal form" which is available from Fidelity Products Co., P.O. Box 155, Minneapolis, MN 55440. However, other forms are available from firms such as Trinity Forms (which can be ordered through Radio Shack), Nebs Computer Forms, 12 South Street, Townsend, MA 01469, and a host of other companies.

Statement is fairly straightforward. It allows you to generate a statement by answering the input prompts and will then print out what you want on the Fidelity universal form. It is set up for the Line Printer VII, but can easily be converted to other printers by changing a couple of the codes. Or, you could eliminate the codes and print the entire form in "normal" size type.

The Listing:

```
1 'THIS PROGRAM WAS WRITTEN BY D
ON H. GARRETT
2 'FOR PcLEAR4co. tm FOR USE ON
FIDELITY'S UNIVERSAL
3 'FORM.  IT IS HOWEVER AVAILABL
E TO ANYONE FOR
4 'THE COST OF $3.99 UNDER THE P
cLEAR4soft TRADEMARK.
5 'THIS PROGRAM IS PRESET FOR A
2% PER MONTH FINANCE
6 'CHARGE (24% ANNUALLY).
10 CLS:PRINT#-2,CHR$(10):LINE IN
PUT "DATE (e.g.) 6/12/82?";D$:IN
PUT "NUMBER";F$
20 LINE INPUT "COMPANY NAME?";L$
:LINE INPUT "STREET ADDRESS?";M$
:LINE INPUT "CITY, STATE & ZIP?"
;N$:LINE INPUT"TELEPHONE NUMBER"
;TN$:PRINT #-2,CHR$(31);L$;CHR$(
30);TAB(49);D$;"    ";F$:PRINT#-2
,M$:PRINT#-2,N$:PRINT#-2,CHR$(13
);TAB(33);TN$:PRINT#-2
30 INPUT "STATEMENT--INVOICE-or-
CREDIT MEMO";X$:PRINT #-2,CHR$(3
1);TAB(13);X$;CHR$(30):PRINT #-2
40 INPUT "SOLD TO: NAME";A$:LINE
 INPUT "STREET ADDRESS?";B$:LINE
 INPUT "CITY?";C$:INPUT "STATE";
S$:INPUT"ZIP CODE";D:INPUT "BILL
ED TO: NAME";AA$:LINE INPUT "STR
EET ADDRESS?";BB$:LINE INPUT "CI
TY?";CC$:INPUT "STATE";SS$:INPUT
 "ZIP CODE";E
50 PRINT #-2,"Sold To:"STRING$(3
8,32);"Billed To:";CHR$(13):PRIN
T#-2:PRINT#-2,A$;TAB(46);AA$:PRI
```


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```
NT#-2,B$;TAB(46);BB$:PRINT#-2,C$
;S$;D;TAB(46);CC$;SS$;E
60 PRINT #-2,CHR$(31);CHR$(13);"
 FINANCE CHARGE     PREVIOUS BALA
NCE"

70 INPUT"PREVIOUS BALANCE";G:PRI
NT#-2,"      $";INT(G*2)/100;"
        $ ";G

80 PRINT #-2,CHR$(30);CHR$(13);S
TRING$(7,32);"TRANSACTION DATE
ARTICLE          ARTICLE #
 PRICE  NEW BALANCE":PRINT #-2

90 LINE INPUT"DATE";E$:LINE INPU
T "ARTICLE?";F$:INPUT "ITEM #";E
:INPUT "PRICE";PR:Z=Z+PR

100 PRINT #-2,TAB(13);E$;TAB(25)
;F$;TAB(40);E;TAB(57);PR;TAB(67)
;Z:PRINT #-2:INPUT "IS THERE MOR
E";K$:IF LEFT$(K$,1)="N" THEN 11
0 ELSE 90

110 PRINT #-2,CHR$(31)STRING$(2,
42);" BALANCE THIS STATEMENT ";S
TRING$(2,42);" $";Z;CHR$(30)

120 PRINT #-2:PRINT #-2,"  The F
INANCE CHARGE is computed by app
lying a 'Periodic Rate' of 2% pe

r month":PRINT#-2,"  which is an
 ANNUAL PERCENTAGE RATE of 24% a
pplied to the previous balance":
PRINT#-2,"  without deducting cu
rrent payments and/or ";

130 PRINT#-2,"credits this state
ment.":PRINT#-2,"  To avoid addi
tional FINANCE CHARGES pay the n
ew balance before the statement
   date next month."
```

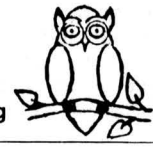

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16K ECB

By Jim Ebbert

The following program, *Starbase Alpha*, is a takeoff on the familiar theme of planet defense against alien attackers from space. It is contributed by Acesoft Software for your enjoyment.

The program is simple to operate and requires some pretty fast work. Although written in Basic, it is difficult to "get" all the attacking missiles.

We contribute the program not only for your enjoyment, but in an effort to sharpen your programming skills as well. Please note some of the routines and feel free to use them in the programs you develop. The end-of-game scoring mechanism is an interesting one which nas many of the features of "initials and scores" found in arcade games.

We hope you will like *Starbase Alpha.*

The Listing:

```
0 '       STARBASE ALHPA
1 '       BY  JIM EBBERT
2 '
3 '      COMPLIMENTS  OF:
4 '      ACESOFT SOFTWARE
5 '      1680 N. PAGE DR.
6 '      DELTONA FL 32725
7 '
8 '
9 '
10 CLEAR200:DIMO$(26):RESTORE:PM
ODE3,1:PCLS:CLS0:PLAY"V30L255T25
5":H$(0)="U10R10D10L10R10BR4":H$
(1)="R10L5U10G5BF5BR9":H$(2)="U5
R10U5L10BD10R10BR4":H$(3)="R10U1
0L10R10D5L8R8D5BR4":H$(4)="BU5U5
D5R10U5D10BR4":H$(5)="R10U5L10U5
R10BD10BR4"
11 DATAU4E4F4L8R8D4BR4,U8R7FD2GL
7R7FD2GL7R7BR5,U8R8L8D8R8BR4,U8R
7FD6GL7R7BR5,U8R8L8D4R6L6D4R8BR4
,U8R8L8D4R6L6D4BR12,U8R8D2U2L8D8
R8U4L4R4D4BR4,U8D4R8U4D8BR4,R4U8
L4R8L4D8R4BR4,U2D2R8U8D8BR4,U8D4
R4E4G4F4BR4,U8D8R8BR4,U8F4E4D8BR
4,U8F8U8D8BR4
12 DATAU8R8D8L8R8BR4,U8R8D4L8D4B
R12,U8R8D8L8R6H2F4H2R2BR4,U8R8D4
L8R4F4BR4,R8U4L8U4R8BD8BR4,BR4U8
L4R8BD8BR4,U8D8R8U8D8BR4,BR4H4U4
D4F4E4U4BD8BR4,U8D8E4F4U8D8BR4,E
8G4H4F8BR4,BR4U4H4F4E4BD8BR4,E8L
8BD8R8BR4
13 FORT=1TO26:READO$(T):NEXTT:PM
ODE3,1:PCLS:H$(6)="U10R10L10D5R1
0D5L10BR14":H$(7)="E10L10BR14BD1
0":H$(8)="U10R10D10L10U5R10D5BR4
":H$(9)="R10U10L10D5R10D5BR4"
14 COLOR3:CIRCLE(60,60),60,3,.6,
.25,.75:CIRCLE(60,40),30,3,.5,.7
5,.25:CIRCLE(60,49),40,3,1.2,.1,
.25:LINE(93,74)-(114,20),PSET:LI
NE-(120,95),PSET,BF:LINE(96,70)-
```


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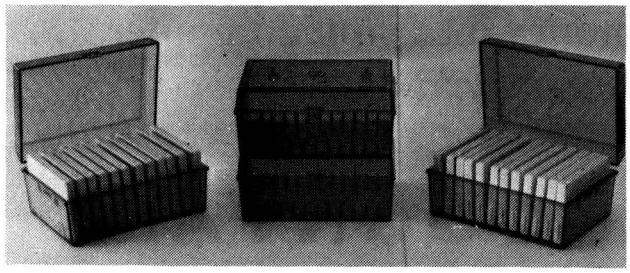
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```
(114,70),PSET
15 DRAW"S4BM+10,+24":R$="CESOFT"
:GOSUB18
16 FORT=2TO4:COLORT:LINE(0,99+T)
-(255,99+T),PSET:NEXT
17 GOTO19
18 L=LEN(R$):FORTY=1TO L:M=ASC(M
ID$(R$,TY,1))-64:IFM=-32THENDRAW
"BR10":NEXTTY:RETURN ELSE DRAWO$
(M):NEXTTY:RETURN
19 DRAW"BM38,120S4C2":R$="S T A
R B A S E":GOSUB18:DRAW"BM14,160
S16C3":R$="ALPHA":GOSUB18:CIRCLE
(128,190),50,3,.3,.5,0:CIRCLE(12
8,190),60,2,.3,.5,0:CIRCLE(128,1
90),70,4,.3,.5,0
20 PLAY"V31L255T25505":PMODE4,1:
SCREEN1,1:FORT=1TO99:PLAY"N"+STR

$(RND(12)):NEXTT
21 FORT=13824TO13838:READD:POKET
,D:NEXT:DEFUSR=13824
22 DATA 142,6,63,166,128,167,136
,191,140,30,0,45,246,57,36
23 PMODE3,1:SCREEN1,0:FORT=1TO7:
K=USR(I):IFT=1THENLINE(0,191)-(2
55,191),PRESET
24 NEXT:LINE(0,191)-(255,178),PR
ESET,BF:PLAY"V26L29T9":DRAW"BM54
,191C4S4":R$="BY JIM EBBERT":GOS
UB18:FORO=1TO5:FORT=1TO12:PLAY"O
"+STR$(O)+"N"+STR$(T):NEXTT,O:PL
AY"V31L1T1":FORK=1TO2:FORI=2TO4:
DRAW"BM54,191S4C"+STR$(I):R$="BY
 JIM EBBERT":GOSUB18:NEXTI,K
25 FORT=13900TO13914:READR:POKET
,R:NEXT:DEFUSR1=13900:V=5:S9=9
26 DATA 142,17,31,166,130,167,13
6,64,140,6,0,46,246,57,36
27 FORT=1TO46:K=USR1(I):NEXT:DRA
W"BM40,60S12C2":R$="READY":GOSUB
18:POKE65315,63:FORI=1TO2:FORT=0
TO255:Y=ABS(T-255):POKE&HFF20,T:
POKE&HFF20,Y:NEXTT,I
28 DRAW"S4"
29 PMODE1,1:PCLS:SCREEN1,0:AA=0
30 O=7:S=6:COLOR2
31 FORT=70TO184STEP8:LINE(T,191)
-(T+8,RND(10)+181),PSET,BF:NEXTT
:LINE(50,191)-(50,180),PSET:LINE
(214,191)-(214,180),PSET
32 DRAW"C1"+D$:K=USR1(I):AA=AA+1
33 A=JOYSTK(0)*4:B=JOYSTK(1)*2.4
:B=INT(B):D$="BM"+STR$(A)+","+ST
R$(B)+"U4D2R2L4":DRAW"C2"+D$
34 IFRND(19)=1THENO=O-1:IFO<1THE
NO=1
35 IFRND(20)=1THENS=S+1
36 IFRND(0)=1THENZX=RND(255):ZY=
RND(30)+25:CIRCLE(ZX,ZY),S,3:PAI
NT(ZX,ZY),3,3
```

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```
37 FORT=4422TO4442STEP4:IFPEEK(T
)<>ØTHENSCREEN1,1:GOTO41
38 NEXTT
39 P=PEEK(65280):IFP=126ORP=254T
HENSCREEN1,Ø:COLOR3:LINE(50,180)
-(A,B),PSET:LINE(214,180)-(A,B),
PSET:COLOR2:PLAY"V31L255T25504N1
2N10N8N6N4N203N12N10N8N6N4N2":LI
NE(A,B)-(50,180),PRESET:LINE(A,B
)-(214,180),PRESET:GOSUB47
40 PCOPY1TO3:PCOPY2TO4:PMODE1,3:
SCREEN1,Ø:PMODE1,1:GOTO32
41 FORT=1TO150STEP10:SCREEN1,1:C
IRCLE(128,180),T,4,.5,.5,Ø:SCREE
N1,Ø:PLAY"V31L255T25501ABGO2C":N
EXT
42 V=Ø:FORH=1TO99:GOSUB48:PLAY"V
"+STR$(V)+"L255T2550"+STR$(RND(5
))+"N"+STR$(RND(12)):NEXTH
43 PMODE3,1:PCLS:SCREEN1,Ø:DRAW"
BM10,20S4C2":R$="YOUR SCORE WAS"
:GOSUB18:PO$=STR$(AA):DRAW"BM10,
80S8C3":GOSUB50:FORT=1TO1999:NEX
TT
44 IFAA>LL THEN LL=AA:GOSUB51
45 PMODE4,1:PCLS:SCREEN1,1:DRAW"
BM10,40S4C5":R$="TOP SCORE":GOSU
B18:DRAW"BM10,100":R$=NJ$:GOSUB1
8:PO$=STR$(LL):DRAW"BR255BL90":G
OSUB50
46 FORT=1TO2222:NEXT:GOTO28
47 FORT=2TOS*1.5STEP2:CIRCLE(A,B
),T,1:NEXT:RETURN
48 IFH/4=INT(H/4)THEN V=V+1
49 RETURN
50 FORL=1TO LEN(PO$):M=VAL(MID$(
PO$,L,1)):DRAWH$(M):NEXTL:RETURN
51 NJ$="":PMODE4,1:PCLS:SCREEN1,
1:R$="WHAT IS YOUR NAME":DRAW"BM
4,20S4C5":GOSUB18:DRAW"BM4,100"
52 A$=INKEY$:IFA$=""THEN52 ELSE
IF A$=CHR$(8)THEN51 ELSE IF A$=C
HR$(13) THEN RETURN
53 IFA$<"A" OR A$>"Z" THEN52
54 NJ$=NJ$+A$:R$=A$:GOSUB18:GOTO
52
```

Hint . . .

Finding ML Addresses

You can find the address of a machine language program by PEEKing several addresses in memory. Those addresses are:

To find the start address, use the command PEEK (487)*256 + PEEK(488)

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Education...

CoCo and the Educational Administrator

By Dr. Paul Kimmelman
Assistant Superintendent, Norton (Ohio) City Schools

PRINT, GOTO, GOSUB, IF-THEN, may all be statements and commands for the computer literate. Yet there are those who may be equally important in the computer world and who don't know a statement from a command. I am referring to the educational administrators who are besieged with information about Apples, PETS, and Radio Shack Color Computers, among others. In many respects, it is unfortunate that school administrators, who have the primary responsibility of assisting with the selection of computers, rarely enjoy the opportunity of working with their implementation in the school program. This problem should not, however, prevent school administrators from becoming actively involved in the study of available hardware for school use.

Almost every school system has gotten into some use of micros. Many schools purchased other brands before the Radio Shack Color Computer became well known and its potential realized. It is becoming clear that the Color Computer made by Radio Shack has unlimited potential in the classroom and, even better, is very reasonably priced.

Even more important for the school personnel is the fact that a publication such as *The Rainbow* supplements the use of the Color Computer through its articles and advertisements. A considerable amount of information, not normally available from Radio Shack can be found in *The Rainbow*.

I would suggest that my colleagues investigate the Color Computer before purchasing other "name" brands. From a cost perspective, the 16K model with the educational institution discount from Radio Shack is unquestionably the best buy available. It should also be emphasized that the Radio Shack network is readily available for service, training and supplies.

To get started is quite simple. Visit the Radio Shack dealer, work with the computer and find out what it can do. Don't overlook the free training programs offered to educators by Radio Shack. One caution, however. Most of the training programs offered by Radio Shack personnel are geared toward Model I and Model III users. It would be ideal if teachers and other educators who take advantage of the Radio Shack offer for free training would apply enough pressure to get classes that deal exclusively with the use of the Color Computer.

Some additional advice would be not to place all of your efforts in Radio Shack to utilize the full potential of your new computers and computer programs. We have found that publications such as *The Rainbow* and other Color Computer journals are outstanding resources. These journals include reviews of materials, educational programs, technical notes, advertisements for available programs and peripheral equipment, and interesting articles that teachers can use to improve their classroom programs.

If funding is a problem, don't be afraid to seek available grant monies. Computers are fairly new and there are many ideas just waiting to be conceived as to how to implement them in school districts. An imaginative teacher and/or administrator should be able to create a proposal that can receive some sources of funding for computer literacy and implementation in their school district.

After purchasing the Color Computer for your school, the fun begins. It is always a delight to observe an excited



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QUALITY PROGRAMS FOR YOUR 80C
PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

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These have been designed to meet the needs of parents and teachers having children just beginning to read.
PREREAD 1 presents the names of the letters of the alphabet auditorially (by voice on the tape) and asks the learner to press the letter on the keyboard which corresponds to that letter name.
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These programs have been developed by a practicing educator in answer to problems which plague teachers of children who cannot read. The dimension of voice from the T.V. monitor adds excitement and realism!
PREREAD 1, 2 & 3 are sold only as a Prereading package. Each program comes on a separate tape, with complete instruction. **$24.95 (available on tape only)**

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The Big, **BIG,** 80C Songbook — The words and Play Statements for over **200** of your favorites. Old songs, new songs, children's songs, hymns, patriotic songs, classical songs, college songs, Christmas songs, and more. These lovely arrangements will provide hours of enjoyment. You also get the songbook on tape (or disk); a two volume set of tapes (or one disk) containing four music programs. Just select the song you want by number, and the title will appear on the screen while the song plays. Sing along with the special arrangements created just for your color computer. Book and tapes (or disk) together are just **$29.95 with tapes and $34.95 with disk,** plus $2.00 shipping.

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A strategy version of America's game. The offense and defense enter their plays, and the results (different each time) are calculated and displayed on the scoreboard. Will they run up the middle or throw the bomb? Are they playing the prevent, or will they blitz? 36 different play combinations provide over 200 possible play outcomes, not counting the variables for yardage gained or lost. Intercept, fumble, blitz, punt, and kick field goals. Even an occasional long run or punt return for a touchdown! Be aware, this isn't another arcade wonder to see who's faster on the joystick, but all you sideline coaches are going to love it. **$19.95 tape — $24.95 disk**

ALL Programs in this ad, including disk versions, carry the Rainbow certification seal!

Your Personal check is welcome - no delay. Include $1.50 shipping for each program ordered. (Shipping free on $50.00 or larger orders). Az. residents add 4% sales tax. Orders shipped within two days.

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teacher and smiling students working on a computer. Perhaps the two main problems that school officials will experience will be:

a) An insufficient number of computers to meet student needs; and

B) a lack of adult supervision.

Due to funding problems in may schools, it is difficult to find a simple solution be being able to purchase more computers. The second problem, however, should be rather easy to resolve. Because of high interest in computers, most school systems should find it relatively easy to find volunteers who would be willing to work with students as supervisors and tutors.

In conclusion, for a reasonable cost most school districts can begin developing computer literacy programs.

Software Review...

Speak To Me In Basic English

I'm an easy target for amazement. So as you might guess, I thoroughly enjoyed having my CoCo actually talk to me after CLOADing this little program and inserting a few simple instructions.

This particular "talk processor" has a vocabulary of 26 words, which it displays on the screen along with a two-letter code for entering the information. Actual human speech is used (digitally stored, of course) to produce the sound. Comparing it to some electronically produced speech I've heard before, I found this, in general, to be extremely clear. One exception, however, is the word "can" which sounded more like "kik-un" to me.

Additional features of the program allow you to add pauses of any desired length between words or statements, and you can choose whether you want to hear your message in high, normal or low voice pitch. I thought the normal and low modes were best. The "high" voice style didn't really seem any higher in pitch, but just faster.

I was a bit surprised at how rapidly I was able to pick up the two-letter codes, but then sometimes I muse with wonder at how often I'm able to get my shoes on the right feet. In this case, however, I think the ease of translation was accomplished by the logic of the two-letter abbreviations used.

The program was developed by digitally recording a human voice, using a microphone, preamplifier and the Color Computer's analog to digital converter.

At any rate, the last thing *The Talkprocessor* said to me in its low, humanoid voice before I sat down to write this review was, "I am great — he he he!"

Not great, maybe, but good.

(HIB, 3505 Hutch Place, Chevy Chase, MD 20815, $14.95 plus $1 s/h)

—Courtney Noe

Cartridge to Tape Back-up

RELOCATOR makes automatic tape copies of the Color Computer cartridges. Allow changes to be made to the program such as (Print-out *Videotex, change band rate in *Scripsit, etc.) Requires either 64K mod. or 4 to 8K of cartridge memory expansion in the address range of &COOO to &DFFF (64K requires some program changes.)

Requires 16K min
Cassette $29.00
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With the PLATINUM WORKSAVER'S editor, there's no more counting the numbers of characters to delete or change, or wondering if you deleted too many or too few. You see the whole line as it's edited. Changes, deletes and inserts are automatic and the cursor can be moved anywhere on the screen.

FULL SCREEN EDITING OF NUMERIC AND STRING ARRAYS

But that's only the beginning! The editor (Written in machine language) also comes with a short, two line BASIC subroutine that will allow you to use the full screen editor on your numeric and string arrays. This is the springboard you need for developing your own VisiCalc™ or word processor.

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• Create the following using only 31 keystrokes: CLS:A$-String$ (15"") + MID$ (CL$, 6, 2). To change the − symbol to = requires only 3 keystrokes!!!!		• **Type** that line using 47 keystrokes. To change the symbol, **Backspace** and **retype** using 33 more strokes!
• Retain the sequence of commands in temporary memory with special reserved key		• **Retype** lost lines!
• One keypush and the right side of the keyboard converts to a numeric Keypad		• **Stretch** those fingers!
• Correct bugs while your program is running, without losing data.		• Oops! **Lost** data! **Retype, Reload** and **Save** data while swearing a lot.
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TRS-80* Model II	no	no	no	yes	$3450.

The PLATINUM WORKSAVER costs $30.00 plus $3.00 S&H (NY residents add 7% tax). To order write:

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platinum software

You're Serious About Your Color Computer.*
SO ARE WE.

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**$30.00 plus $599, suggested price for 16K Color Computers (we do not sell the computers).

Spectaculator Help...

A Small Business Accounting System

By Judd C. Posner

One of the nice things about a ROM pack such as *Spectaculator* is that even a rank beginner such as myself can use it almost as well as the pros. My only previous computer experience was a course taken seven years ago on using FORTRAN in scientific research; I learned very little programming and lots of formatting, just the sort of experience *Spectaculator* requires.

Having convinced myself that I was thus uniquely qualified, I fearlessly undertook my first task, that of justifying the purchase of the Color Computer to a somewhat dubious family. To do this, I had promised my wife I would set up an accounting system for her small consulting business.

Since most of her expenses are connected with the use of a car to travel to and from her work, I tackled that part first.

After a few quick passes at the problem, it became clear that conceptually one is dealing with two different types of functions, namely a logging and totalling function and a calculational one.

An example of the first function is the tracking of miles driven for business purposes. The second type is illustrated by the calculation of the amount deductable from income taxes derived from automotive expenses. *Spectaculator* can handle either function quite easily, but not both at once.

The easiest course, and therefore the one I took, was to allocate different parts of the worksheet *Spectaculator* provides to the different functions. Rows 1-79 and columns 1-99 were allocated to the logging and totalling of recurrent expenses. Rows 80-99 were set aside for the calculations related to taxes. In actual practice, only columns 1-17 were needed for the logging and totalling functions; however, this leaves a lot of empty space should I later need it for any purpose. Likewise, only rows 80-94 were used for the tax calculations, leaving room for five more entries if required later.

A look at how the column entries were formatted brings up some interesting points. For example, in Figure 1, rows 1-6 are devoted to the calculation of the miles driven for business. Odometer readings which are recorded in a notebook in the car are transferred to rows 1-4. Two sets of columns are needed because the number of entries made will exceed the number of rows on the worksheet. The computer calculates net mileage by subtracting the initial odometer readings in columns 1 and 3 from the final readings in columns 2 and 4 and places that value in column 5. The cumulative total is calculated and recorded in column 6.

A word of warning here, *Spectaculator* will not perform the desired calculations if the same number of entries are not made in columns 3 and 4 as are made in columns 1 and 2. There are two ways of handling this problem. You can fill all the rows in columns 1-4 with zeros initially and then simply enter values over them. This is messy, tedious, and slows down the calculations somewhat by requiring many needless calculations to be performed.

I have a partial fix to offer for the tedium of entering one zero at a time to fill a column. If zero is entered as the column formula, and then a calculate command is given, *Spectaculator* will enter zeros in all rows not containing text down to the last row which contains data. This trick does not appear in the manual and is potentially very useful.

The other, and to my mind more convenient, way is to use what, for want of a better name, I call the Chinese restaurant technique: one on column A and one in column B. Just make entries across the rows rather than down the columns. Then you will have to enter at most one set of zeros. Other recurring expenses are treated in the same way in columns 7-17 in figures 2 and 3.

The calculations relating to taxes are performed starting at row 80, column 25, although clearly they could be done anywhere starting on row 80. The features of this part of the work sheet are the bringing down of cumulative totals from columns 6, 11, 14 and 17, the entering of non-recurrent automotive expenses in rows 86-89, and finally the calculations themselves. These are illustrated in Figure 4. The calculation of the amount deductable for tax purposes is done in two ways. The first calculation is done as follows:

(1) The total miles driven for the year is calculated by subtracting the odometer reading at the beginning of the

```
1       2       3       4       5       6
                                C4-C3   ISMTC5
                                +C2-C1
                        BUSINESS MILES
START     END   START     END   TOTAL     CUM
41265   41290   41297   41354      82      82
42774   42780   42799   42845      52     134
42845   42886   42907   42957      91     225
43021   43229   43255   43270     223     448
```

Figure 1

```
 8       9      10      11
                C8+C9   SMTC10
          PARKING
AMT PD  AMT PD   TOTAL     CUM
   2.5       2    4.50    4.50
     2     1.5    3.50    8.00
  1.75    1.85    3.60   11.60
  2.25     2.5    4.75   16.35
```

Figure 2

```
13      14      15      16      17
        SMTC13                  SMTC16
  FUEL&OIL                REP&PTS
AMT PD    CUM           AMT PD    CUM
  12.5  12.50             58.86  58.86
    14  26.50
```

Figure 3

```
80                                      BUS MI(C6)
81      IR83-R82                        TOT MI
82                                      YR START
83                                      YR END
84                                      FUEL&OIL(C14)
85                                      REP&PTS(C17)
86                                      LIC
87                                      INS
88                                      DEPR'N
89                                      LOAN INT
90                                      PARK(C11)
91      R80/R81                         ALLOC FRAC
92      R84+R85+R86+R87+R88+R89         ALLOC AMT
93      R92*R91+R90                     CALC 1(AL)
94      R80*0.2+R90                     CALC 2(NO AL)
```

Figure 4

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
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- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...
— Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

...truly a state of the art word processor... outstanding in every respect.
— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

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Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (714) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

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year from that at the end of the year, as entered in lines 82 and 83 respectively.

(2) The fraction of the total automotive expenses which can be allocated to business expenses is calculated by taking the ratio of business miles driven to total miles driven (row 91).

(3) The allocatable amount is calculated by summing all expenses (excet parking, a totally business expense), done in row 92.

(4) Finally, deductable expenses are calculated by multiplying the allocatable amount by the allocatable fraction and adding parking costs (row 93).

The second calculation is done simply by multiplying the business miles by 0.2 (the flat rate deduction of 20 cents per business mile) and adding parking. The calculation which gives the higher number is then used for tax purposes.

I make entries in the upper (columnar) part of the worksheet monthly, and some examples are included in Figures 1-3. However, the calculations for tax purposes can only be made at the end of the year, so no entries are shown in Figure 4. The column from which the last row figure is to be entered is given in parentheses as a reminder.

One final piece of advice for my fellow beginners, who, like me, not only don't know much about programming, but are also confused by the jargon being spoken by the "old-timers." Don't buy a peek in a poke—not even for an inky dollar.

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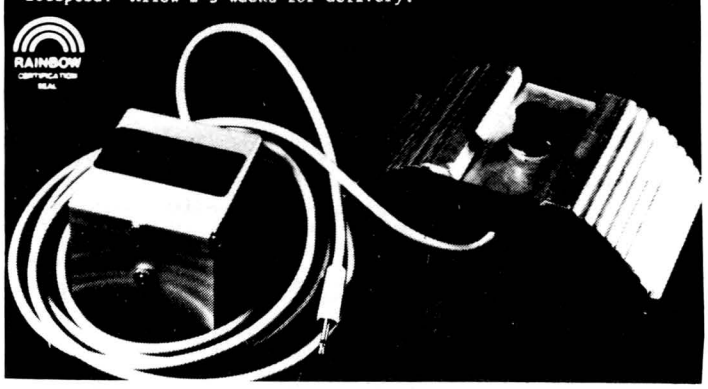
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RAINBOW



Hint. . .

Speed CoCo Up

You can double the speed at which CoCo operates with a simple POKE statement, entered either directly from the keyboard or within a program. The statement is POKE 65495,0. This will speed up your CPU. You can return the computer to its normal speed again by POKE 65494,0.

Note that you cannot perform any Input/Output operations (such as saving the program to cassette) when the speedup is in effect.

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55 More Color Computer Programs For the Home, School & Office



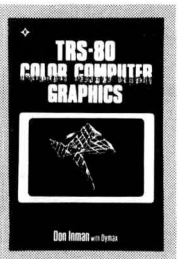
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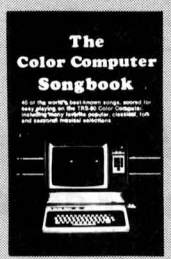
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TRS-80 Color Computer Graphics



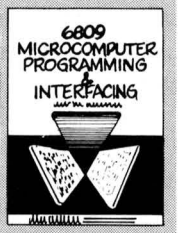
By Don Inman with Dymax from Reston
Learn the fascinating graphics capabilities of Extended Color BASIC—how to create graphics to enhance your programs ***and*** how to write your ***own*** graphics programs. Includes: coloring; lines and circles; using joysticks; switching from graphics to text mode; sound. With sample programs and 5 appendices.
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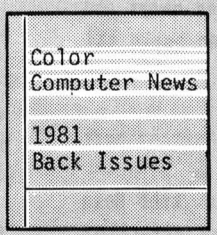
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Ed. by Staugaard from Howard W. Sams
This book offers a complete description of how to program and interface the 6809 microprocessor. Topics include: chip structure and basic 6809 concepts; addressing modes; registers and data movement instructions; arithmetic, logic and test instructions; branching; input and output signals; interfacing and applications. Review questions and answers for each chapter, plus 4 appendices.
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Color Computer News 1981 Back Issues



This is the complete collection of articles appearing in the first 4 issues of Color Computer News (May to December of '81). 37 different topics are covered, plus continuing features like "REMarks", Kid's Page, and New Products.
Softcover, $9.95

6809 Assembly Language Programming



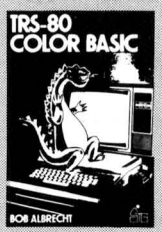
By Lance Leventhal from McGraw Hill
This comprehensive book covers 6809 assembly language programming in detail. The entire instruction set is presented and fully explained. The book contains many fully debugged, practical programming examples with solutions in both object code and source code. Discussion of assembler conventions, I/O devices, and interfacing methods is also included. If you've never before programmed in assembly language, this book will teach you how. If you're an experienced programmer, you'll find this book an invaluable reference to the 6809 instruction set and programming techniques.
Softcover, $16.95

TRS-80 Programs and Applications for the Color Computer



By Alfred Baker from Reston
Handy guide to your Color Computer: how to play games, balance your checkbook, use your computer as a teacher, etc. With chapters on color and sound, art and music. Helpful for beginning or experienced computer users.
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TRS-80 Color Basic



By Bob Albrecht from John Wiley & Sons
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Hardware Review...

Sam Saver Is A Useful Addition

How many times have you walked into your "CoCo Room" after a long day, gone to turn on your favorite computer only to discover you forgot to turn it off the evening before?

If the answer is "guilty as charged," you might consider the *Sam Saver*.

Its a very simple device, really. Just a little black box that plugs into one of the joystick ports and sits there. But, there is a little red LED in the middle of the box that glows when the 80C is on. And one look will tell you whether you forgot to turn CoCo off or not.

Considering the cost of a SAM chip, which seems to get the hottest and is thus most susceptible to heating problems, a *Sam Saver* can save you money, time and lots of aggrivation. It works just fine.

(Spectrum Projects, 93-16 86 Drive, Woodhaven, NY 11421, $14.95 plus $1 s/h)

Software Review . . .

Foreign Language Baseball Is Fun And Educational, Too

Foreign Language Baseball is a series of three programs which can provide some fun and still help drill your children in a foreign language. The cassettes are available for Spanish, French and Italian.

To make things easier for drill, the learning is in the form of a baseball game. The student selects either easy or hard levels, and then proceeds to play.

Using the low resolution screen, the programs draw a baseball diamond, complete with blocks for the pitcher and hitter. The player is then asked a word—either in English or the language of the game he is playing.

A correct response gets a hit or a walk. If the answer is incorrect, the player makes an out. Three outs to the inning, of course.

Once the inning is over, the three words which are missed are shown on the screen, along with their correct answer. This reinforces the display of the correct answer during the "inning," when the correct answer is shown if the player gets it wrong. The end-of-inning sequence allows the player to study the correct answers as long as he wishes before moving to the next frame, where the score is shown. The player can go on for nine innings, or can quit at the end of any one.

In the easy version, the computer chooses between the first 20 numbers and 10 additional vocabulary words. The hard level adds an additional 70 vocabulary words, for a total of 100. However, since the program answers questions both ways—translate English to foreign language or foreign language to English, there are 200 possible questions to each.

It is our view that these programs are educationally sound and the graphics, while not spectacular, are good enough to keep a child's interest. The idea of making word drill in a foreign language into something as American as a baseball game is somewhat unique and creative.

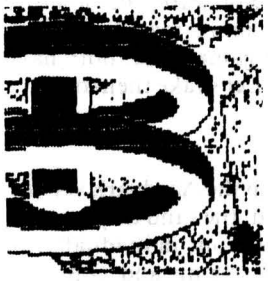
Finally, since the program is written in Basic, one would assume it is easy to modify the vocabulary words. This makes a fine program even better.

(Computer Island, 227 Hampton Green, Staten Island, NY 10312, $9.95)



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("photo-negative")



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Software Review...

Invader's Revenge Turns The Tables On Space Invaders

If you like shoot-em-up arcade games, but remain a frustrated Earthling who's been zapped countless times by marauders of some far-away, malevolent galaxy, *Invader's Revenge* offers an interesting twist, and assures the loser of at least a moral victory.

Here, in this battle zone, *you* are the alien invader attempting to destroy the mighty Earth forces while dodging fire from a patrolling laser base, below, and fleeing the determined Kamikaze ships which endlessly search the space lanes intent on your destruction.

At the outset of *Invader's Revenge*, you have three ships in the upper-left corner of the screen, above a horizontal line which is the ceiling barrier of the battle zone. Below are rows of scanning ships and the roaming laser base which sends periodic photon blasts vertically upward. You activate one Invader ship at a time by pressing the "down" arrow key, and thereafter control your ship's flight by using the four directional arrow keys. You fire your missiles (vertically downward, only) by pressing the space bar. Destroying the defenders and staying alive by the coordinated effort of four fingers and a thumb is a digital *tour de force* which gives this game a high challange rating from me.

The points you score by destroying the defenders' ships (100 points for a regular member of the fleet; 1000 points for the elusive flagship) are displayed as a running total at the top of the screen.

Invader's Revenge can be played by one or two players, and has two variables to be selected at the beginning of the game which determine the difficulty level. You choose the speed of the action from five levels and the number of missiles you may fire in a given time. In addition, the game has the interesting feature of allowing you to freeze the action. You do this by striking the "P" key. (The accompanying brochure tells us that this stands for "pause" rather than giving any indication as to why you might want a short break.) Hitting any key resumes the action.

This is a machine-language offering with good graphics and adequate sound effects. If you have facile fingers and a thoroughly-oiled thumb, you might want to give this one a try. You have nothing to lose but your life at the hands of a relentless force of Earth's staunch defenders. And, it's interesting to get the "feel" of what it must be like to be a space invader—being shot at by just about everybody.

(Med Systems Software, P.O. Box 3558, Chapel Hill, NC 27514, $19.95)

—Jim Reed

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Two *Golf* Programs Offer Different Features

What with fall much upon us and winter coming on, all but the most hardy (or those of you who live in less frigid climes) will have to put up the old golf clubs for another year.

Not so with CoCo, because two software firms have programs called *Golf* which will allow you to play to your heart's content all winter long.

One *Golf* is offered by Tom Mix Software, the other by Aardvark-80. Both give you much more realistic golfing than anything we've seen in a board game. And, both have their advantages and disadvantages. Let's take them one at a time.

Aardvark-80

By far the best display is available in the Aardvark version of *Golf*. The fairways are well defined, the sand traps are the same and the trees in the rough stand out individually. In fact, the course is very interesting-looking and comes as close to being a real layout, due to use of the high resolution screen, as most anything we have seen.

Play is accomplished by choosing a club. You then indicate a direction in which you want to shoot. This is done by moving a small cursor until it matches your chosen direction. You then simply press the space bar and the ball—a single pixel—goes whizzing off in the direction you choose.

If you land in a bunker you need a sand wedge and you can also use a putter. You determine the length of your shots by specifying long, medium or short with different ranges for each.

Club and shot length selection is made on the text screen, by pressing a letter "C" and you are also updated as to how many shots you have taken. However, there is no cumulative score. Each of the nine holes is scored individually.

When you do get on the green, the "pin" is taken down. You can then use your putter to hole out.

In addition, the Aardvark program allows you to shoot over things, like trees and water. There is a chart to show how high a shot will go.

Our major complaint with this program is that it does not allow use of all the clubs. And, you can only use your driver one time per hole. However, this is highly outweighed by the easy of use of the game, the fine graphics and the realistic play. We really like seeing the ball go flying off and it is fun to try to shoot over a tree.

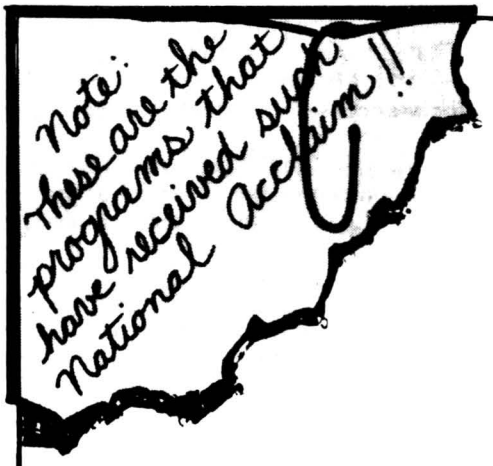
Tom Mix Software

The Tom Mix version uses a lower resolution (but not *low resolution*) screen and its detail is, obviously, not as fine. There are no trees although there are sand traps.

In much the same as the Aardvark version, Mix' *Golf* lets you choose a club. However, you select direction by the figures on a clock face, which does not give detail as fine as the Aardvark game (although you may choose fractional directions as well).

Ball flight in this program is shown by a line and is not quite as exciting as is the Aardvark. However, Mix allows you use of all the clubs at any time (except the putter, which can only be used when you are on the green).

Mix, however, goes for a detail of the green once you have landed on it: the display changes to show only the green. Here you get to choose the distance you wish to putt as well



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Hint . . .

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The answer is a simple one: Just type in EXEC 41175 and the version of your ROM will be printed on the screen.

Corrections

In the review of the three editor/assembler packages in the October issue, the Cer-Comp program was reported as not having either a symbol table or a cross-reference listing. It has both. The same review also said the program did not allow listings to be stopped as the scroll on the screen. The program does allow scrolling to be halted.

In the Accounts Recievable program in October change line 940 to read:

940 IF K1$(X)="D" THEN PP=PP+L1(X) ELSE IF K1$(X)="C" THEN PP=PP-L1(X)

Add the following line: **945 M1(X)=PP**

Change Line 2230 to read: **2230 IF K1$(X)="C" THEN M1(X)=M1(X)-L1(X)**

In the General Ledger program for October, add the following line:

1315 POKE 16425,PL+1

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as the direction—a better choice than Aardvark's long, medium and short shots.

Mix also allows four players to participate at one time and keeps the scores updated for each—both for the match and for the hole. A plus. And, Mix shows the par, hole number and distance on the graphic screen, which Aardvark does not.

Both games are easy to play and are enjoyable. Based on what you want, you should choose the one which appeals to you the most and enjoy *Golf* even when there is a blizzard raging outside.

(Aardvark-80, 2352 S. Commerce, Walled Lake, MI, 48088, $9.95. Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, $16.95 plus $1 p/h))

Software Review...

Got Troubles Now? Here's Frustration Cubed!

Rubic's Cube, as it turns out, was only something to while away the time until we could get our hands on this fascinating little software program. Now, at least, we can go completely fruitcakes in the comfort and privacy of our own CoCo cloister, and not have to face the pity and shock of strangers as we slip into psycho-geometric collapse while waiting for a bus, or something.

Once you CLOAD *CC Cube*, you might have a bit of trouble relating the instructions to the way the squares actually shift. That's because even though the concept of the game is simple (realigning the 54 squares so that all six sides of the cube are solid colors), the interrelated moves are quite complex. And visualizing the three-dimensional puzzle on a two-dimensional screen seems to add the lost dimension to the degree of difficulty.

Never mind this. The game is fun, and you can overcome the problem by running *CC Cube* with only one or two random mixes until you determine just how the squares are shifting. Also, by striking the "?" key you can review the instructions at any time.

While playing *CC Cube*, you have two very colorful, oblique views of the cube on your screen, so you can see all six sides at once. To come close to achieving this advantage with the old-fashioned, solid model, you would have to, according to Einstein, suspend the cube from a string and race past it at near the speed of light—without running into anything. (Just another example of the trouble your CoCo can save you!)

Since this game can take considerable time to play, especially if you input more than four or five random mixes of the squares, it has a handy ability to *CSAVE* your cube in position until you have time to finish. Another helpful feature is its ability to retrace, in order, as many of your moves as you wish—up to 125. I defy any solid-cuber to try that!

Besides having brilliant color, *CC Cube* has pleasant little beeps accompanying the moves, and gives you a sound-salute if you happen to keep your wits long enough to corral all those galloping squares.

(Superior Oracle Software, 27 Church St. West, Greenwich, CT 06830, $14.95)

—Courtney Noe

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Hardware Review...

Two Modems Provide A Way To Communicate

By Joel Sampson

Data telecommunications—linking computers by telephone lines—is becoming increasingly popular. And the TRS-80 Color and TDP System-100 computers are certainly not lagging behind in the trend.

What can you hook your CoCo up to? Well, there are two main outlets for paid timesharing—CompuServe and The Source. Both of these services charge for the time used and can make your personal computer into a "big" computer by interfacing it to their large mainframes. They also have a database of newspapers, newsletters and other information for home and business.

In addition, there are many local bulletin boards in various parts of the United States, Canada, Australia and across the world. One of the most popular for the Color Computer is Connection-80 in Woodhaven, N.Y., although many others write into *the Rainbow*, which will print names and addresses.

Most of these bulletin boards allow electonic mail to be sent and received and have a general bulletin information section. Most usually allow for the transfer of some software. These services are usually free, although some are for club members only.

What else can you do with your CoCo in the area of telecommunications? How about giving a friend a proggram you just wrote via the phone—or starting *your* own bulletin board? There are a lot of things you can do with a modem, providing the modem and your communications software has the ability to do them.

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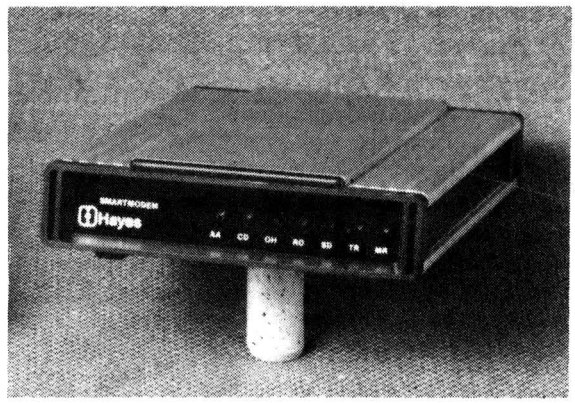
What do you need to get started in all of this? Besides your trusty CoCo, you need a modem, short for modulator/demodulator. The modem generates tones that can be communicated over a telephone line.

In addition, you need communication software—which usually does not come with the modem. Radio Shack sells Videotex in a ROM pack and there are many other more sophisticated packages on tape, disk and ROM pack available (see advertisments in *the Rainbow*).

But the one hardware item you have to have is a modem. This is a review of two of them: The Hayes Samrtmodem and the Radio Shack Modem I.

Hayes Smartmodem

This modem lists for $299 but is available for $250 or less from several sources. The Hayes is a direct connect modem that connects to your telephone line with wires. This style is



usually preferred over "acoustic" coupled modems—in which the handset of the telephone is placed in a cradle and data is transferred via sound through the handset.

The Smartmodem contains a Z8 microprocessor chip, which is similar to the Z80 but also has a tiny Basic on the board. This allows you to program the modem using any language.

For instance, when using the modem to timneshare with another system, you can dial directly from the computer keyboard by entering the letters A, T, D and the telephone number. The Smartmodem than dials the number and tells you when a carrier tone is received from another computer.

It also has a built-in speaker so you can listen to the dial tones. The speaker shuts off when the carrier is received unless you program it to remain on continuously. A rear-mounted gain control adjusts the volume.

You need a telephone line, but not necessarily a telephone, to use the Smartmodem. This is because of the auto-dial capability. You can also dial Touch-Tone tones if your telephone system will accept them.

If the line is busy, the modem automaticallt hangs up after about 30 seconds, or you can hang it up manually by hitting any key. If the line is busy, you can redial by just hitting A/. Seven LED's indicate the modem's status at all times.

The modem operates at 300 baud or less, and nother model has just reached the market that allows operation at 300 or higher-speed 1200 baud. For most uses with the Color Computer, the 300 baud rate is the best choice, especially considering the higher speed modem is more than twice as expensive.

The Hayes Smartmodem also has automatic answering capabilities. In this mode, you can dial your CoCo from a remote terminal via the telephone line or start your own bulletin board service; providing you have the proper software to drive the system. You can program the modem

COLOR COMPUTER NEW!

MACRO-80C

The Micro Works is pleased to announce the release of its **disk-based editor, macro assembler and monitor**, written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

The powerful 2-pass macro assembler features conditional assembly, local labels, include files and cross referenced symbol tables. MACRO-80C supports the complete Motorola 6809 instruction set in standard source format. There are no changes, constraints or shortcuts in the source language definition. Incorporating all of the features of our Rompack-based assembler (SDS80C), MACRO-80C contains many more useful instructions and pseudo-ops which aid the programmer and add power and flexibility.

The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80C allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

DCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. MACRO-80C **Price: $99.95**

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Why?

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- Forth is easier to learn than Assembly Language
- Forth executes in less time than Basic

Forth is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The Micro Works Color Forth is a Rompack containing everything you need to run Forth on your Color Computer.

Color Forth consists of the standard FORTH Interest Group (FIG) implementation of the language plus most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. Color Forth also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. Color Forth contains 10K of ROM, leaving *your* RAM for *your* programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound. The 112-page manual includes a glossary of the system-specific words, a full standard FIG glossary and complete source listing. COLOR FORTH ... THE BEST! From the leader in Forth, Talbot Microsystems. **Price: $109.95**

SOFTWARE DEVELOPMENT SYSTEM

The Micro Works Software Development System (SDS80C) is a complete 6809 editor, assembler and monitor package contained in one Color Computer program pack! Vastly superior to RAM-based assemblers/editors, the SDS80C is non-volatile, meaning that if your application program bombs, it can't destroy your editor/assembler. Plus it leaves almost all of 16K or 32K RAM free for **your** program. Since all three programs, editor, assembler and monitor are co-resident, we eliminate tedious program loading when going back and forth from editing to assembly and debugging!

The powerful screen-oriented Editor features finds, changes, moves, copys and much more. All keys have convenient auto repeat (typamatic), and since no line numbers are required, the full width of the screen may be used to generate well commented code.

The Assembler features **all** of the following: complete 6809 instruction set; conditional assembly; local labels; assembly to cassette tape or to memory; listing to screen or printer; and mnemonic error codes instead of numbers.

The versatile monitor is tailored for debugging programs generated by the Assembler and Editor. It features examine/change of memory or registers, cassette load and save, breakpoints and more. **SDS80C Price: $89.95**

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PARALLEL PRINTER INTERFACE — Serial to parallel converter allows use of all standard parallel printers. PI80C plugs into the serial output port, leaving your Rompack slot free. You supply the printer cable. **PI80C Price: $69.95**

GAMES

Star Blaster — Blast your way through an asteroid field in this action-packed Hi-Res graphics game. Available in ROMPACK; requires 16K. **Price: $39.95**
Pac Attack — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. **Price: $24.95**
Berserk — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. **Price: $24.95**
Adventure — *Black Sanctum* and *Calixto Island* by Mark Data Products. Each cassette requires 16K. **Price: $19.95** each.
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Also Available: Machine Language Monitor ★ 2-Pass Disassembler ★ Memory Upgrade Kits ★ We Stock 64K Chips ★ Parts and Services ★ Books ★ Call or write for information

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to answer the phone from 0 to 255 rings.

The modem can be programmed to operate in full or half duplex, which is useful if you want to access a mainframe operating at half duplex but your software is written for full duplex. In addition to the multitude of things than can be programmed into the modem, you can automatically change some of the defaults with built-in DIP switches. The unit comes with a well-written manual that fully describes how to use and program the unit.

The modem uses a standard DB25 connector, so you need a cable with a four-pin DIN plug on one end and the standard RS-232C connector on the other (Radio Shack part number 26-3014). It connects to the phone line with a standard modular plug. The phone line plugs into the modem with a standard modular plug, a nice feature because if the cord ever goes bad you can replace it with a standard telephone extension cord.

The modem is housed in an attractive aluminium case. A wall-mounted AC transformer provides the power.

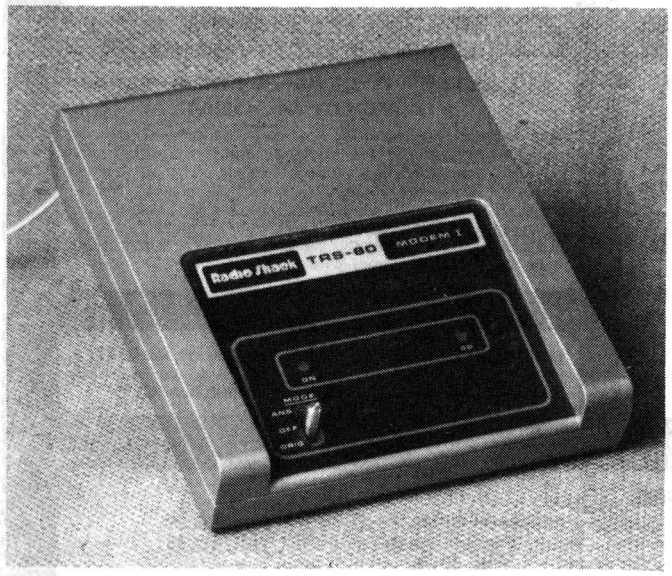
On the negative side, the modem does not include an outlet for a telephone in it, so if you want to use both the telephone and the modem you will need an adapter to allow both to be connected at the same time.

In summary, the Hayes Smartmodem is a versatile modem at a reasonable price. You may not use all the features, such as auto answer, but you will not grow out of it in the future should your needs change.

Radio Shack Modem I

If you want a fairly inexpensive direct connect modem, the Radio Shack Direct Connect Modem I may be a good choice. While not as flashy and versatile as the Hayes Smartmodem, the Modem I works well.

The modem will not automatically dial or answer and



cannot be programmed. It operates at 300 baud or less and lists for $149, but is available for less.

The modem is housed in the familiar silver-colored plastic case that matches the Color Computer. It has a permanently mounted telephone cord with a modular plug on the end. An outlet for a telephone is provided on the modem, so an adapter is not needed to use both the modem and the telephone. A wall-mounted AC power transformer is provided.

Operation of the modem is easy. A front-mounted switch has off, answer and originate positions. When timesharing, the originate position is usually used. Two LEDs indicate when the unit is on and when a carrier is detected.

The Modem I has two connectors to hook it to computer. A standard DB25 allows it to be used with the CoCo and the Models I, II, and III, as well as most other computers with an RS-232C board. A four-pin DIN plug can also be used with CoCo. This enables you to use an inexpensive cable when connecting the two units.

In summary, if you want a versatile modem with many features, consider the Hayes Smartmodem. But, if your needs are for simple, highly reliable data communications, the Radio Shack Modem I will do the job for less money.

DISK—Continued From Page 25

display with which upper and lower case letters are to appear on a green screen. (Note: the writer's copy of the *Disk Scripsit* program would not function in that mode.) The trade off again, if the user selects to use the graphic display method to get screen display in upper and lower case; expect to lose the memory that system will grab. Again, the user has the option and can decide which tradeoff he can live with as he works through a letter or book.

The edit operations are the same as those found in the rompack. The Disk has the same fast type over correction, using backspace (left arrow); deleting words or letters by overtyping or deleting with the space bar and closing up the gap with the clear key; inserting words or more with the command key "Break and 3" which opens a space as large as the user wants (moving other text to adjust for the new material); moving (or deleting) blocks of text; duplicating in more than one place the same block of text; and search and replace.

The *Disk Scripsit* program also supports the "hyphenation" package; placement of Headings and Footers; page numbering; and adds underlining and elongating for those printers that can accept those instructions. The program provides the user the option to change the instructions in the program to match those required by your printer (should it not happen to be a Radio Shack model). The baud rate is also user selectable.

The program hs not overlooked the user's need to establish text width (up to 132 if your printer is so equipped), margins, lines per page, line space, and page numbers.

Text material may be saved to disk, sent to printer, sent to spooler (so a printer can work and the user can go on to another text operation). Text may be loaded from disk or tapes (created by the rompack).

The print function was the second problem encountered with this writer's copy of *Disk Scripsit*. The program worked through all the general options (with graphic system turned off); but would not work with my printer. (The printer wrote graphic codes instead of letters.)

A very interesting sub-menu is presented as part of the exit routine. The user may select to "start a clock display-hours, minute, seconds—upper right on screen"; "display free space map"; "copy a file"; "run a program"; or exit back to Basic.

Comments

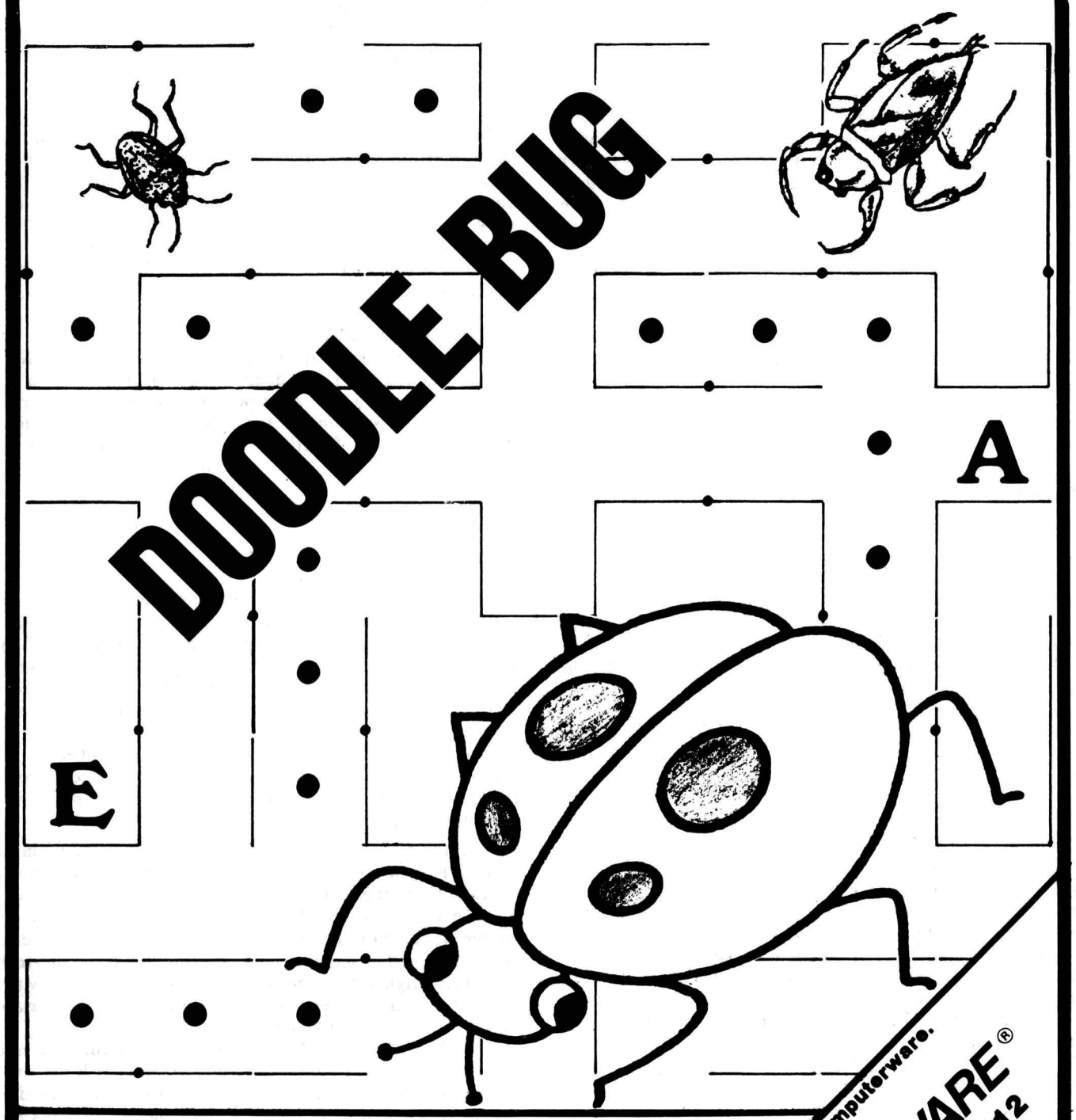
It is possible that my disk system might have caught a "bug" and would not handle the graphic option and the print driver in the program. The *Disk Scripsit* is back at the Computer Center for checking.

It would be a shame if somehow when the *Disk Scripsit* was put together, Radio Shack decided to write a special printer driver into the system to drive just their line of printers. If that has happened, the usability of the program by more users will be reduced and what might be a great program would drop to just another program. (This review was written with tried and trusted rompack.)

Follow-Up on Disk Scripsit

Today I was able to work with the good folks at our local Computer Center to get *Disk Color Scripsit* up and running.

We were able to get the program to run on Radio Shack



DOODLE BUG by David Crandall

Mama always said Lady Bugs were good & other bugs were bad. This fun arcade game agrees! In hi-res graphics, your lady bugs hussle through an intricate maze of barriers & turnstyles, trying to earn points by eating all the dots, letters, & hearts. Enemy bugs buzz after you! And you must avoid the skulls! Exquisite sound & graphics!

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equipment. Thus, the program disk is not a fault.

The sales team, Manager, and Tech Reps, all pitched in to try to figure out what was happening to the program on my Color Computer. No answers, however, but a few ideas. First, the program would not go to the graphic screen (which has both upper and lower case letters) on my system.

Idea was that maybe my old color TV (an old tube type) could not handle the information sent. The new Radio Shack unit they have hooked up to the Color Computer handled the output without trouble. The program does give a true upper and lower case type on the green screen. The appearance and color were great. However, you lose almost 2K of memory using the graphic mode.

No one could give me any answer for why the printer I own (an Okidata 82A) will work with all the other programs but will only print graphics from the print driver within *Disk Scripsit*. My first fear was that some place in the program a special driver routine was embedded. The print commands work on Radio Shack printer. We tested that in the store (at first we had a small problem...the printer was set for parallel and had to be set for serial interface...the Tech Reps took care of that and we were off and gone).

The caution would be for any purchaser to be sure that the program will work with the printer in use on the system. Maybe later Radio Shack will have a patch for other printers or someone with more smarts will come up with the routine to make it work on any unit.

A few more comments I can add now that I had a chance to see the print routine work (on Radio Shack equipment):

All the fine work that went into the program, yet there was no right justification ability.

Print from disk while working on another edit function works, but the operations are jurky, keyboard response is slow and sometimes double prints occur, and the call to any other commands is slow. Granted, the action is put into the time gaps, but it was so jurky and rough that I would not be happy with that mode. But it does work!

Spectaculator

The other disk program, *Disk Spectaculator*, functioned without one bug!!

The rom pack was a very friendly program and *Disk Spectaculator* is just as friendly. This disk program has however, opened new doors for the user that were never possible in the rompack version.

The tradeoff (beside speed in loading) is that the disk program does not have a provision or option to load programs which were saved on tape using the rompack.

This disk version has all of the 16 functions that were part of the rompack. The major additions are "Assign Variables", "Partial Save on Disk", "Display Free Memory", and "Zap Worksheet."

The disk version has a "help list" which is called up with "?" as the answer to the command prompt. All of the command codes are two letters (for the most part the first letters of the key words of the commands) and make operating the program fast. The codes and commands are:

MM—Move Marker
EN—Enter Numbers
CF—Column Formula Entry
RF—Row Formula Entry
AV—Assign Variables
CA—Calculate
ET—Enter Text
CR—Clear Row
CC—Clear Column
CW—Change Column Width
FR—Display Free Memory
ZW—Zap Worksheet
DR—Delete Row
IR—Insert Row
IC—Insert Column
SA—SAve on Disk
PS—Partial Save on Disk
LO—LOad from Disk
LI—LIst to Printer
?—Help Lists

The user (with enough memory) might create a spread sheet of 99 columns and 99 rows. The screen display is not a limit, however, as by use of the MM command, or arrows, any selection of the spread sheet can be put on the screen for view and entry/changes. This means that every "cell" is callable. The "cell" is defined by ROW number and COLUMN number (written: 1,1 or 25,30). This function becomes more important when setting up a formula since the contents of a specific cell can be used as "variable."

The number handling ability is the reason for the program. A cell can be loaded with a number with nine digits (six to the right of the decimal point). The cells in the COLUMN and ROW may be acted upon by a formula entered to work from the top down or from left to right. Among the fixed functions that may be placed in the formula are:

"+" addition
"-" subtraction
"*" multiplication
"/" division
"!" exponential power

The addition of "exponential power" is new and welcomed. Coupled with the "SQR" command which gives the square root of the values specified; "SUM" will total the value in a ROW or COLUMN (as long as the first cell has a value entered); and "SMT" gives the cumulative total as well as the final computed total value of a specified column.

The answers computed can be requested to be displayed as integers or decimal numbers. A nice little addition is that one need not worry about an answer larger than the space set for the column, the column is automatically expanded to meet the need.

The ability of the user to establish a table of 22 variables (which have mode names of "VA through VV") which may be called into the formula to interact on the data in the cells is a very powerful NEW tool. The variable code may be either a constant (like PI) or the value of a particular worksheet cell. Assigning a variable the value of a yet-to-be computed figure by naming its location gives a totally new way of moving through complex problems. The variable may be up to nine digits each.

The Partial Save to Disk is also a very useful took since the data within the limits the user describes will be saved. This might be the result of the several operations called for by the user's program. Then, the data may be put back on a clean worksheet to be worked on again (zap off and load in again, etc.) The Disk version demands that such saves be given names. Again, the single command to wipe the worksheet clean is great.

Printing hard copy is just as simple as it was with rompack. Thus, if a worksheet was larger than the 80 column limit; no problem, by using the MM command, sectors of the sheet may be printed and later pasted up to give the large size hard copy.

The last nice touch that should not go without notice is that on the disk are five files which a newcomer to the program can call up to see on the screen (the same files as are in the manual) to follow the instructions to see how they work.

The disk version of Spectaculator is an improvement over the very useful rompack and opens many new uses for the programmer or novice user.

NOW THERE ARE TWO TOOLKITS FOR THE COLOR COMPUTER

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- ☐ **Delete all spaces** (not in PRINT strings, DATA or REMARK lines)
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- — Same program works with tape or disk and in 16 or 32K
- — Entire system totally **removable** at any time
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- — Green/Orange text screen capability
- — Easily **modifiable** command syntax

The Kits are relocatable programs that load any time without bothering your BASIC program or variables or top of memory address. All tools may be turned on or off at will, including the Kit itself.

The tools are available with simple three or four letter commands entered in the direct mode, with the entire instruction set viewable through the HELP command.

The Colorkit is 5K bytes for $29.95
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Personal Uses...

How Healthy Are You? This Program Tells You

32K ECB



By John Fernald

Personal health is a subject that comes more and more into the center-stage of interest each year. A number of national publications have featured articles on health in recent months and there are more books showing up every day on how to look, and feel, more healthy.

The August 10, 1982 issue of *Family Circle* magazine published an extensive self-test on health and I undertook to adapt it for use with the 80C. The test itself is based on a risk analysis developed by Howard F. Hunt, Ph.D., and James R. White, Ph.D., of the University of California, San Diego. It is adapted from "The Blue Cross and Blue Shield Guide To Staying Well," copyright ©1982 by Blue Cross Association and Blue Shield Association, published by Contemporary Books, Inc.

While I am sure that it is possible for others to "fancy" up this program, it does accomplish what it is intended to do, that is, provide a health assessment. To that end I believe it certainly serves a good purpose, and if it helps only one of *the Rainbow's* thousands of readers improve their health status, then the hours I have spent writing it will be rewarded.

The program itself is easy to use. Simply answer the questions. At the end, you will get a score. Responses to the questions, and the weighted values they are assigned, should not be construed as a hard-and-fast assessment of your physical health. If you have any concerns about your health, you should contact a physician.

In short *Health*, should not be considered a replacement for a visit to a physician. While it *can* give you certain general opinions about your health status, it cannot give you either a "clean bill of health" or detect any and all problems.

The Listing:

```
5 CLS
10 CLEAR2000
50 DATA I FEEL I OVEREAT-,(A) US
UALLY,(B) OCCASIONALLY,(C) RAREL
Y,***
51 DATA I HAVE INDIGESTION-,(A)
OFTEN,(B) OCCASIONALLY,(C) RAREL
Y,***
52 DATA AT THE TABLE I SALT MY
        FOOD-,(A) USUALLY,(B) OC
CASIONALLY,(C) RARELY,***
53 DATA MY REFINED SUGAR AND   S
WEETS CONSUMPTION IS-,(A) AVERAG
E OR ABOVE,(B) LESS THAN AVERAGE
,(C) VERY LOW,***
54 DATA MY DAILY SUGAR SUBSTI- T
UTE SERVINGS ARE-,(A) THREE OR M
ORE,(B) ONE OR TWO,(C) NONE,***
55 DATA MY DAILY ALCOHOL CON-  S
UMPTION IS-,(A) THREE OR MORE DR
INKS,(B) TWO,(C) ONE,(D) NONE
56 DATA MY TOTAL WEEKLY EGG    C
ONSUMPTION IN ALL FOOD IS-,(A) T
EN OR MORE,(B) EIGHT OR NINE,(C)
 SEVEN OR LESS,***
57 DATA MY BREAD CONSUMPTION   C
ONSISTS OF-,(A) ENRICHED WHITE,(
B) LIGHT BROWN OR WHEAT,(C) WHOL
E WHEAT,***
58 DATA MY CEREAL CONSUMPTION  C
ONSISTS OF-,(A) REGULAR BOXED CE
REALS,(B) VITAMIN ENRICHED WITH
EXTRA ROUGHAGE,(C) WHOLE GRAIN,*
**
59 DATA MY DAILY SOFT DRINK (8 O
Z) CONSUMPTION IS-,(A) THREE OR
MORE,(B) ONE OR TWO,(C) NONE,***
60 DATA MY DAILY TEA CONSUMP-  I
ON IS-,(A) FIVE OR MORE CUPS,(B)
 TWO TO FOUR CUPS,(C) TWO CUPS O
R LESS(OR HERBAL),***
61 DATA MY DAILY COFFEE CONSUMPT
ION IS-,(A) FOUR OR MORE CUPS,(B
) TWO OR THREE CUPS,(C) DECAFFEI
NATED,(D) ONE CUP OR LESS
62 DATA I USE MAINLY-,(A) BUTTER
,(B) HARD MARGARINE,(C) SOFT OR
LIQUID      MARGARINE(OR NONE),*
**
63 DATA MY DAILY ROUGHAGE      I
NTAKE CONSISTS OF-,(A) NORMAL DI
ET,(B) EXTRA SALAD AND RAW VEGET
ABLES,(C) EXTRA SOURCE OF      FI
BER ONCE OR TWICE PER DAY,***
64 DATA MEAT IN MY DIET        C
ONSISTS MAINLY OF-,(A) HIGH IN S
ATURATED   FAT(PORK DUCK LIVER S
TEAK ETC),(B) LOWER IN SATURATED
  FAT(LEAN BEEF FISH VEAL CHICKE
N ETC),(C) MEATS LOWEST IN     S
ATURATED FAT(FISH CHICKEN OR NO
MEAT),***

65 DATA THE DAIRY PRODUCTS IN  M
Y DIET ARE MOSTLY-,(A) WHOLE-MIL
K CREAM    (INCLUDE MOST CHEESE)
 IMITATION DAIRY,(B) LOW-FAT DAI
RY PRO-  DUCTS,(C) SKIM MILK OR
NO     DAIRY PRODUCTS OR LOW FAT
 CHEESE,***
66 DATA I AM ANXIOUS/NERVOUS-,(A
) OFTEN,(B) OCCASIONALLY,(C) SEL
DOM,***
67 DATA I WOULD DESCRIBE MYSELF
AS-,(A) HIGHLY COMPETITIVE,(B) M
ODERATELY COMPETI- TIVE,(C) NOT
COMPETITIVE,***
68 DATA WHEN CONFRONTED WITH A S
ITUATION THAT BOTHERS ME-,(A) I
KEEP IT TO MYSELF,(B) I MAY OR M
AY NOTSAY SOMETHING,(C) I ALWAYS
 SAY SOME-  THING ABOUT IT,***
```

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```
69 DATA CRITICISM OR SCOLDING  B
OTHERS ME-,(A) GREATLY,(B) MODER
ATELY,(C) HARDLY AT ALL,***
70 DATA IN MY WORK SUCCESS IS-,(
A) VERY IMPORTANT,(B) MODERATELY
 IMPORTANT,(C) NOT IMPORTANT,***
71 DATA I GO OUT OF MY WAY TO
AVOID UNPLEASANT ACQUAINTANCES-,
(A) OFTEN,(B) OCCASIONALLY,(C) R
ARELY,***
72 DATA I HAVE SPELLS OF THE
BLUES-,(A) OFTEN,(B) OCCASIONALL
Y,(C) RARELY,***
73 DATA I HAVE DISTURBED SLEEP-,
(A) OFTEN,(B) OCCASIONALLY,(C) R
ARELY,***
74 DATA PEOPLE DISAPPOINT ME-,(A
) OFTEN,(B) OCCASIONALLY,(C) RAR
ELY,***
75 DATA I AM DEPRESSED-,(A) OFTE
N,(B) OCCASIONALLY,(C) RARELY,**
*
76 DATA IN MY OWN WORK I AM    C
ONFRONTED WITH MAKING IMPORTANTD
ECISIONS-,(A) OFTEN,(B) OCCASION
ALLY,(C) SELDOM,***
77 DATA I BELIEVE THAT OUR     C
OUNTRY IS 'GOING TO THE DOGS'-,(
A) AGREE GREATLY,(B) AGREE MODER
ATELY,(C) AGREE HARDLY AT ALL,**
*
78 DATA I AM SEXUALLY FRUSTRA- T
ED,(A) OFTEN,(B) OCCASIONALLY,(C
) RARELY,***
79 DATA I AM SECRETIVE-,(A) GREA
TLY,(B) MODERATELY,(C) HARDLY AT
 ALL,***
400 PRINT@129,"THE BLUE CROSS &
BLUE SHIELD"
402 PRINT@168,"HEALTH EXAMINATIO
N"
404 PRINT:PRINT@225,"TAKEN FROM
THE AUGUST 10,1982"


406 PRINT@257,"ISSUE OF FAMILY C
IRCLE MAGAZINE"
408 PRINT@293,"PROGRAM BY: JOHN
FERNALD":PRINT@329,"NEWBURY PARK
, CA":PRINT:PRINT:PRINT:PRINT
410 INPUT"CONTINUE (<ENTER> KEY)
";ZZ$:IF ZZ$="!"THEN GOTO 410 EL
SE 415
415 CLS:PRINT"      YOU'VE HEARD
PLENTY ABOUT"
416 PRINT"MANAGING YOUR DIET, GE
TTING"
417 PRINT"MORE EXERCISE, COMBATI
NG STRESS"
418 PRINT"AND GENERALLY IMPROVIN
G YOUR"
419 PRINT"LIFE-STYLE."
420 PRINT"      THIS TEST WILL DE
TERMINE"
421 PRINT"YOUR 'WELLNESS SCORE'
RIGHT"
422 PRINT"NOW, AND WILL PINPOINT
 WHAT"
423 PRINT"YOU CAN DO TO IMPROVE
IT THIS"
424 PRINT"WEEK, THIS MONTH, THIS
 YEAR,"
425 PRINT"AND FOR THE REST OF YO
UR TO-"
426 PRINT"MORROWS!":PRINT:PRINT:
PRINT
428 INPUT"CONTINUE(<ENTER> KEY)"
;ZZ$:IFZZ$="!"GOTO428 ELSE 430
430 CLS:PRINT@38,"HOW TO TAKE TH
E EXAM":PRINT
432 PRINT"      CHOOSE THE ANSWER
 IN EACH"
434 PRINT"CATEGORY THAT IN YOUR
JUDGEMENT"
436 PRINT"MOST ACCURATELY AND HO
NESTLY"
438 PRINT"REFLECT YOUR HABITS AN
D LIFE-"
440 PRINT"STYLE, AND THE COMPUTE
R WILL DO"
442 PRINT"THE REST.":PRINT:PRINT
:PRINT:PRINT:PRINT:PRINT
444 INPUT"CONTINUE(<ENTER> KEY)"
;ZZ$:IFZZ$="!" THEN GOTO444 ELSE
 GOSUB4000
466 PRINT:PRINT:INPUT"          AN
SWER";QQ$
468 N=0
469 IF QQ$="A"THEN AA=N
470 IFQQ$="B"THEN AA=N+1
471 IFQQ$="C"THEN AA=N+3
472 GOSUB4000
473 PRINT:PRINT:INPUT"          AN
SWER";QQ$
474 N=0
475 IFQQ$="A"THEN AB=N
476 IFQQ$="B"THEN AB=N+1
477 IFQQ$="C"THEN AB=N+3
478 GOSUB4000
480 PRINT:PRINT:INPUT"          AN
SWER";QQ$
481 N=0
482 IFQQ$="A"THEN AC=N
484 IFQQ$="B"THEN AC=N+1
486 IFQQ$="C"THEN AC=N+3
488 GOSUB 4000
490 PRINT:PRINT:INPUT"          AN
SWER";QQ$
```

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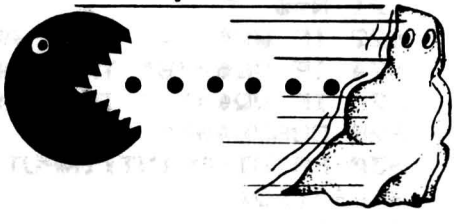
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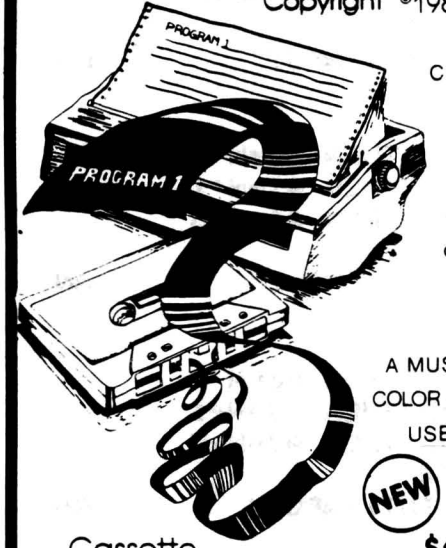
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```
491 N=0
492 IFQQ$="A"THEN AD=N
494 IFQQ$="B"THEN AD=N+1
496 IFQQ$="C"THEN AD=N+3
498 GOSUB 4000
500 PRINT:PRINT:INPUT"          AN
SWER";QQ$
501 N=0
502 IFQQ$="A"THEN AE=N
504 IFQQ$="B"THEN AE=N+1
506 IFQQ$="C"THEN AE=N+3
508 GOSUB 4000
510 PRINT:PRINT:INPUT"          AN
SWER";QQ$
511 N=0
512 IFQQ$="A"THEN AF=N
514 IFQQ$="B"THEN AF=N+1
515 IFQQ$="C"THEN AF=N+2
516 IFQQ$="D"THEN AF=N+3
518 GOSUB 4000
520 PRINT:PRINT:INPUT"          AN
SWER";QQ$
521 N=0
522 IF QQ$="A"THEN AG=N
524 IFQQ$="B"THEN AG=N+1
526 IFQQ$="C"THEN AG=N+3
528 GOSUB4000
530 PRINT:PRINT:INPUT"          AN
SWER";QQ$
531 N=0
532 IF QQ$="A"THEN AH=N
534 IF QQ$="B"THEN AH=N+1
536 IF QQ$="C"THEN AH=N+3
538 GOSUB 4000
540 PRINT:PRINT:INPUT"          AN
SWER";QQ$
541 N=0
542 IF QQ$="A"THEN AI=N
544 IF QQ$="B"THEN AI=N+1
546 IF QQ$="C"THEN AI=N+3
548 GOSUB4000
550 PRINT:PRINT:INPUT"          AN
SWER";QQ$
551 N=0
552 IF QQ$="A"THEN AJ=N
554 IF QQ$="B"THEN AJ=N+1
556 IF QQ$="C"THEN AJ=N+3
558 GOSUB4000
560 PRINT:PRINT:INPUT"          AN
SWER";QQ$
561 N=0
562 IF QQ$="A"THEN AK=N
564 IF QQ$="B"THEN AK=N+1
566 IF QQ$="C"THEN AK=N+3
568 GOSUB4000
570 PRINT:PRINT:INPUT"          AN
SWER";QQ$
571 N=0
572 IF QQ$="A"THEN AL=N
574 IF QQ$="B"THEN AL=N+1
575 IF QQ$="C"THEN AL=N+2
576 IF QQ$="D"THEN AL=N+3
578 GOSUB4000
580 PRINT:PRINT:INPUT"          AN
SWER";QQ$
581 N=0
582 IFQQ$="A"THEN AM=N
584 IFQQ$="B"THEN AM=N+1
586 IFQQ$="C"THEN AM=N+3
588 GOSUB4000
590 PRINT:PRINT:INPUT"          AN
SWER";QQ$
591 N=0
592 IFQQ$="A"THEN AO=N
594 IFQQ$="B"THEN AO=N+1
596 IFQQ$="C"THEN AO=N+3
598 GOSUB4000
600 PRINT:PRINT:INPUT"          AN
SWER";QQ$
601 N=0
602 IFQQ$="A"THEN AP=N
604 IFQQ$="B"THEN AP=N+1
606 IFQQ$="C"THEN AP=N+3
608 GOSUB4000
610 PRINT:PRINT:INPUT"          AN
SWER";QQ$
611 N=0
612 IFQQ$="A"THEN AQ=N
614 IFQQ$="B"THEN AQ=N+1
616 IFQQ$="C"THEN AQ=N+3
618 GOSUB4000
620 PRINT:PRINT:INPUT"          AN
SWER";QQ$
621 N=0
622 IF QQ$="A" THEN AR=N
624 IF QQ$="B" THEN AR=N+1
626 IF QQ$="C" THEN AR=N+3
628 GOSUB4000
630 PRINT:PRINT:INPUT"          AN
SWER";QQ$
631 N=0
632 IF QQ$="A" THEN AY=N
634 IF QQ$="B" THEN AY=N+1
636 IF QQ$="C" THEN AY=N+3
638 GOSUB 4000
640 PRINT:PRINT:INPUT"          AN
SWER";QQ$
641 N=0
642 IF QQ$="A" THEN AU=N
644 IF QQ$="B" THEN AU=N+1
646 IF QQ$="C" THEN AU=N+3
648 GOSUB 4000
650 PRINT:PRINT:INPUT"          AN
SWER";QQ$
651 N=0
652 IF QQ$="A" THEN AV=N
654 IF QQ$="B" THEN AV=N+1
656 IF QQ$="C" THEN AV=N+3
```

```
658 GOSUB 4000
660 PRINT:PRINT:INPUT"          AN
SWER";QQ$
661 N=0
662 IF QQ$="A" THEN AW=N
664 IF QQ$="B" THEN AW=N+1
666 IF QQ$="C" THEN AW=N+3
668 GOSUB 4000
670 PRINT:PRINT:INPUT"          AN
SWER";QQ$
671 N=0
672 IF QQ$="A" THEN AX=N
674 IF QQ$="B" THEN AX=N+1
676 IF QQ$="C" THEN AX=N+3
678 GOSUB 4000
680 PRINT:PRINT:INPUT"          AN
SWER";QQ$
681 N=0
682 IF QQ$="A" THEN AZ=N
684 IF QQ$="B" THEN AZ=N+1
686 IF QQ$="C" THEN AZ=N+3
688 GOSUB 4000
690 PRINT:PRINT:INPUT"          AN
SWER";QQ$
691 N=0
692 IF QQ$="A" THEN BA=N
694 IF QQ$="B" THEN BA=N+1
696 IF QQ$="C" THEN BA=N+3
698 GOSUB 4000
700 PRINT:PRINT:INPUT"          AN
SWER";QQ$
701 N=0
702 IF QQ$="A" THEN BB=N
704 IF QQ$="B" THEN BB=N+1
706 IF QQ$="C" THEN BB=N+3
708 GOSUB 4000
710 PRINT:PRINT:INPUT"          AN
SWER";QQ$
711 N=0
712 IF QQ$="A" THEN BC=N
714 IF QQ$="B" THEN BC=N+1
716 IF QQ$="C" THEN BC=N+3
718 GOSUB 4000
720 PRINT:PRINT:INPUT"          AN
SWER";QQ$
721 N=0
722 IF QQ$="A" THEN BD=N
724 IF QQ$="B" THEN BD=N+1
726 IF QQ$="C" THEN BD=N+3
728 GOSUB 4000
730 PRINT:PRINT:INPUT"          AN
SWER";QQ$
731 N=0
732 IF QQ$="A" THEN BE=N
734 IF QQ$="B" THEN BE=N+1
736 IF QQ$="C" THEN BE=N+3
738 GOSUB 4000
740 PRINT:PRINT:INPUT"          AN
SWER";QQ$
741 N=0
742 IF QQ$="A" THEN BF=N
744 IF QQ$="B" THEN BF=N+1
746 IF QQ$="C" THEN BF=N+3
748 GOSUB 4000
750 PRINT:PRINT:INPUT"          AN
SWER";QQ$
751 N=0
752 IF QQ$="A" THEN BG=N
754 IF QQ$="B" THEN BG=N+1
756 IF QQ$="C" THEN BG=N+3
758 GOSUB5000
4000 CLS
4010 REM****NUTRITION****
4020 READQ$
4030 PRINT@98,"QUES    "Q$
4040 READR$
4050 PRINT@200,R$
4060 READS$
4070 PRINT@296,S$
4080 READT$
4090 PRINT@392,T$
4091 READU$
4092 PRINT@488,U$
4100 RETURN
5000 CLS
5010 PRINT@2,"QUES    MY EXERCIS
E PROGRAM   CONSISTS OF-"
```


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```
5020 PRINT@66,"(A) LITTLE OR NO
EXERCISE"
5030 PRINT@98,"(B) WALKING PROGR
AM 3 OR MORE DAYS PER WEEK"
5040 PRINT@162,"(C) EASY TO MODE
RATE EXERCISE 3 OR MORE DAYS PER
 WEEK"
5050 PRINT@226,"(D) FAIRLY VIGOR
OUS EXERCISE   IN EXERCISE ATTIR
E 3 OR MORE    DAYS PER WEEK"
5060 PRINT@322,"(E) HEAVY EXERCI
SE IN EXERCISE ATTIRE 3 OR 4 DAY
S PER WEEK"
5070 PRINT@386,"(F) HEAVY EXERCI
SE IN EXERCISE ATTIRE 5 TO 7 DAY
S PER WEEK"
5080 PRINT:INPUT"          ANSWER"
;QQ$
5081 N=0
5082 IF QQ$="A" THEN BH=N
5083 IF QQ$="B" THEN BH=N+1
5084 IF QQ$="C" THEN BH=N+2
5085 IF QQ$="D" THEN BH=N+5
5086 IF QQ$="E" THEN BH=N+8
5087 IF QQ$="F" THEN BH=N+10
5090 CLS
5100 PRINT@2,"QUES    MY OCCUPAT
IONAL ACTI- VITIES CONSIST OF-"
5110 PRINT@98,"(A) MOSTLY MENTAL
 ACTIVITY    WITH LITTLE OR NO M
ANUAL LABOR"
5120 PRINT@162,"(B) COMBINATION
OF MENTAL AND MANUAL LABOR"
5130 PRINT@226,"(C) MOSTLY MANUA
L LABOR (PER- SPIRE FROM MY WORK
)"
5140 PRINT:PRINT:PRINT:PRINT:PRI
NT:INPUT"          ANSWER";QQ$
5141 N=0
5182 IF QQ$="A" THEN BI=N
5183 IF QQ$="B" THEN BI=N+2
5184 IF QQ$="C" THEN BI=N+4
5190 CLS
5200 PRINT@2,"QUES    MY RECREAT
IONAL ACTI- VITIES AND HOBBIES I
NVOLVE-"
5210 PRINT@98,"(A) INTERMITTENT
EXERTION (AS GARDENING,DOUBLES T
ENNIS,SAIL-  ING AND SEDENTARY A
CTIVITIES)"
5220 PRINT@194,"(B) FAIRLY SUSTA
INED,MODERATE-LY FATIGUING EXERT
ION (SINGLES  TENNIS,HIKING,LIGH
T BICYCLING)"
5230 PRINT@290,"(C) PROLONGED AN
D FATIGUING   EXERTION (SUSTAINE
D JOGGING,RUN-NING,DISTANCE SWIM
MING)"
5240 PRINT:PRINT:PRINT:INPUT"
     ANSWER";QQ$
5241 N=0
5242 IFQQ$="A" THEN BJ=N
5243 IFQQ$="B" THEN BJ=N+2
5244 IFQQ$="C" THEN BJ=N+4
5250 CLS
5260 INPUT"MY HEIGHT(INCHES)=";B
L:IF BL<=60 THEN BN =61 ELSE BN=
BL
5280 INPUT"ARE YOU MALE(M) OR FE
MALE(F)";BK$:IF BK$="F" THEN GOS
UB9100 ELSE BM=106+(6*(BN-60))
5290 PRINT@100,"SELECT ONE OF TH
E FOLLOWING"
5300 PRINT@130,"(A) I HAVE A MED
IUM FRAME"
5310 PRINT@194,"(B) I AM SMALL B
ONED"
5320 PRINT@258,"(C) I AM LARGE B
ONED"
5330 PRINT:INPUT"          ANSWER"
;QQ$
5340 IFQQ$="A" THEN BO=BM
5350 IFQQ$="B" THEN BO=BM-(BM*.1
)
5360 IFQQ$="C" THEN BO=BM+(BM*.1
)
5365 BR=INT(BO)
5370 PRINT@384,"YOUR IDEAL BODY
WEIGHT ="BR"LBS"
5380 INPUT"MY ACTUAL WEIGHT (LBS
) =";BP
5390 IF BP<=BR THEN BQ=10
5395 IF BQ=10 THEN GOTO 5500
5400 BS=BP-BR

5405 IF BS<=3 THEN BQ=9:IF BQ=9
THEN GOTO5500
5410 IFBS<7 THEN BQ=7:IF BQ=7THE
NGOTO5500
5415 IF BS<11 THEN BQ=5:IFBQ=5TH
ENGOTO5500
5420 IFBS<16THENBQ=2:IFBQ=2THENG
OTO5500
5425 IFBS<21THENBQ=0:IFBQ=0THENG
OTO5500
5430 IFBS<31THENBQ=-2:IFBQ=-2THE
NGOTO5500
5435 IFBS<41THENBQ=-4:IFBQ=-4THE
NGOTO5500
5440 IFBS<51THENBQ=-6:IFBQ=-6THE
NGOTO5500
5445 IFBS<76THENBQ=-8:IFBQ=-8THE
NGOTO5500
5450 IFBS>=76THENBQ=-10:IFBQ=-10
THENGOTO5500
5500 CLS
```

You must vaporize the pests with your laser and pesticide bombs. Pest control is a never-ending task in this space simulation. Be quick about it. If you take too long to clear a wave of pests, the AVENGER appears and homes in on your PestiCraft.

A random Vengence Encounter throws you into a world with droid-filled birds. You have to destroy them, but every time they burst, a myriad of droids are released and begin a relentless assault on your ship. AVENGER is joystick compatible.

AVENGER is available for the TRS 80™ Color Computer at your favorite software dealer. MasterCard & Visa orders accepted. $19.95 tape, $1.50 shipping and handling charges.

The Cornsoft Group

6008 N. Keystone Avenue
Indianapolis, IN 46220 (317) 257-3227



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TRS 80™ Color Computer is a registered trademark of the Tandy Corporation.

```
5510 PRINT@32,"I SMOKE ? - A.OVE
R 30 CIGARETTES/DAY OR (IN-HALE
PIPE/CIGAR)."
5515 PRINT@96,"B.21-30 CIGARETTE
S/DAY."
5520 PRINT@128,"C.10-20 CIGARETT
ES/DAY."
5525 PRINT@160,"D.1-9 CIGARETTES
/DAY."
5530 PRINT@192,"E.>20 CIG/DAY-QU
IT 5-10 YR AGO."
5535 PRINT@224,"F.<20 CIG/DAY-QU
IT 5-10 YR AGO."
5540 PRINT@256,"G.>20 CIG/DAY-QU
IT >10 YR AGO."
5545 PRINT@288,"H.NEVER SMOKED-L
IVED WITH SMOKER >10 YRS."
5550 PRINT@352,"I.NEVER SMOKED-L
IVED WITH SMOKER <10 YRS."
5555 PRINT@416,"J.5-19 CIG/DAY-Q
UIT >10 YR AGO."
5560 PRINT@448,"K.NEVER SMOKED O
R LIVED W/SMOKER"
5570 INPUT"          ANSWER";QQ$
5572 N=0
5574 IFQQ$="A"THENBU=N-15
5576 IFQQ$="B"THENBU=N-10
5578 IFQQ$="C"THENBU=N-8
5580 IFQQ$="D"THENBU=N-5
5582 IFQQ$="E"THENBU=N+3
5584 IFQQ$="F"THENBU=N+5
5586 IFQQ$="G"THENBU=N+6
5588 IFQQ$="H"THENBU=N+7
5590 IFQQ$="I"THENBU=N+8
5592 IFQQ$="J"THENBU=N+10
5594 IFQQ$="K"THENBU=N+10
5600 CLS
5610 PRINT"I HAVE -"
5615 PRINT@32,"A. WORKED IN A SM
OKY OFFICE FOR     16 OR MORE YRS
."

5620 PRINT@96,"B. WORKED IN A SM
OKY OFFICE FOR     10-15 YRS."
5625 PRINT@160,"C. WORKED IN A S
MOKY OFFICE FOR     1-9 YRS."
5630 PRINT@224,"D. LIVED IN A SM
OGGY AREA FOR 10    OR MORE YRS."
5635 PRINT@288,"E. LIVED IN A SM
OGGY AREA FOR 1     TO 9 YRS."
5637 PRINT:PRINT
5640 INPUT"          ANSWER";QQ$
5642 N=0
5644 IFQQ$="A"THENBV=N-3
5646 IFQQ$="B"THENBV=N-2
5648 IFQQ$="C"THENBV=N-1
5650 IFQQ$="D"THENBV=N-2
5652 IFQQ$="E"THENBV=N-1
5700 CLS
5710 PRINT@2,"I AM -"
5715 PRINT@66,"A. MALE"
5720 PRINT@130,"B. PREMENOPAUSE
FEMALE"
5725 PRINT@194,"C. POSTMENOPAUSE
 FEMALE"
5726 PRINT@258,"D. NOT FAMILIAR
WITH MY BLOOD PRESSURE VALUES.
ENTER D TO OB-TAIN AN AVERAGE SC
ORE VALUE.
5727 PRINT:PRINT:PRINT
5730 INPUT"          ANSWER";QQ$
5735 IFQQ$="A"THENGOTO9200
5740 IFQQ$="B"THENGOTO9300
5745 IFQQ$="C"THENGOTO9400
5750 IFQQ$="D"THENCD=8:IFCD=8THE
NGOTO5800
5800 CLS
5810 PRINT@2,"I HAVE -"
5815 PRINT"A. HAD EMPHYSEMA (BRE
ATHING OB- STRUCTION FOR 10 YRS
OR MORE."
5820 PRINT"B. HAD EMPHYSEMA FOR
1-9 YR."
5825 PRINT"C. HAD A HEART ATTACK
 OR HEART  DISEASE."
5830 PRINT"D. NOT HAD HEART ATTA
CK/DISEASE BUT HAVE HAD HEART/CH
EST PAIN."
5835 PRINT"E. OR HAVE HAD DIABET
ES."
5840 PRINT"F. OR HAVE HAD KIDNEY
 DISORDER."
5845 PRINT"G. OR HAVE HAD THYROI
D COND."
5850 PRINT"H. OR HAVE HAD GOUT."
5855 PRINT"I. OR HAVE HAD LEG CR
AMPS."
5857 PRINT"J. NONE OF THE ABOVE.
"
5860 PRINT:INPUT"          ANSWER"
;QQ$
5861 N=0
5862 IFQQ$="A"THENCE=N-3
5864 IFQQ$="B"THENCE=N-1


5866 IFQQ$="C"THENCE=N-10
5868 IFQQ$="D"THENCE=N-5
5870 IFQQ$="E"THENCE=N-5
5872 IFQQ$="F"THENCE=N-3
5874 IFQQ$="G"THENCE=N-3
5876 IFQQ$="H"THENCE=N-3
5878 IFQQ$="I"THENCE=N-2
5880 IFQQ$="J"THENCE=N
5900 CLS
5910 PRINT@2,"I HAVE THE FOLLOWI
NG NUMBER OFPARENTS OR GRANDPARE
NTS WHO HAD HEART DISEASE, STROK
```

```
E OR CIRCU- LATORY DISORDER WHIC
H OCCURED   BETWEEN THE INDICATE
D AGES -"
5912 PRINT
5915 PRINT"A. 1 OR MORE UNDER AG
E 50."
5920 PRINT"B. 2 OR MORE 50 - 60
YRS."
5925 PRINT"C. 1 50 - 60 YRS."
5930 PRINT"D. 2 OVER 60 YRS."
5935 PRINT"E. 1 OVER 60 YRS."
5940 PRINT"F. NONE"
5945 PRINT:PRINT
5950 INPUT"         ANSWER";QQ$
5951 N=0
5952 IFQQ$="A"THENCF=N
5954 IFQQ$="B"THENCF=N+1
5956 IFQQ$="C"THENCF=N+2
5958 IFQQ$="D"THENCF=N+3
5960 IFQQ$="E"THENCF=N+5
5962 IFQQ$="F"THENCF=N+10
6000 CLS
6010 PRINT@2,"I AM A -"
6015 PRINT"A. MALE,STOCKY & BALD
"
6020 PRINT"B. MALE,STOCKY"
6025 PRINT"C. MALE"
6030 PRINT"D. FEMALE, 55 OR OVER
"
6035 PRINT"E. FEMALE, 54-50"
6040 PRINT"F. FEMALE, 49-36"
6045 PRINT"G. FEMALE, 35 OR UNDE
R"
6050 PRINT:PRINT:PRINT
6055 INPUT"         ANSWER";QQ$
6060 N=0
6062 IFQQ$="A"THENCG=N
6064 IFQQ$="B"THENCG=N+1
6066 IFQQ$="C"THENCG=N+2
6068 IFQQ$="D"THENCG=N+7
6070 IFQQ$="E"THENCG=N+8
6072 IFQQ$="F"THENCG=N+9
6074 IFQQ$="G"THENCG=N+10
6100 CLS
6110 PRINT@164,"I AM A -"
6115 PRINT@197,"A. MALE"
6120 PRINT@229,"B. FEMALE"
6125 PRINT:PRINT
6130 INPUT"         ANSWER";QQ$
6140 IFQQ$="A"THENGOTO6200ELSEGO
TO6500
6200 CLS
6204 PRINT@164,"MY AGE IS -"
6206 INPUT"         ANSWER";CH
6210 IFCH>=72THENCI=3:IFCI=3THEN
GOTO9000
6215 IFCH>67THENCI=0:IFCI=0THENG
OTO9000
6220 IFCH>63THENCI=1:IFCI=1THENG
```


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```
OTO9000
6225 IFCH>60THENCI=2:IFCI=2THENG
OTO9000
6230 IFCH>56THENCI=3:IFCI=3THENG
OTO9000
6235 IFCH>53THENCI=4:IFCI=4THENG
OTO9000
6240 IFCH>48THENCI=5:IFCI=5THENG
OTO9000
6245 IFCH>43THENCI=6:IFCI=6THENG
OTO9000
6250 IFCH>39THENCI=7:IFCI=7THENG
OTO9000
6255 IFCH>34THENCI=8:IFCI=8THENG
OTO9000
6260 IFCH>20THENCI=9:IFCI=9THENG
OTO9000
6265 IFCH<=20THENCI=10:IFCI=10TH
ENGOTO9000
6500 CLS
6504 PRINT@164,"MY AGE IS -"
6506 INPUT"          ANSWER";CH
6510 IFCH>=79THENCK=3:IFCK=3THEN
GOTO9000
6515 IFCH>74THENCK=2:IFCK=2THENG
OTO9000
6520 IFCH>69THENCK=1:IFCK=1THENG
OTO9000
6525 IFCH>65THENCK=0:IFCK=0THENG
OTO9000
6530 IFCH>59THENCK=2:IFCK=2THENG
OTO9000
6535 IFCH>53THENCK=4:IFCK=4THENG
OTO9000
6540 IFCH>45THENCK=6:IFCK=6THENG
OTO9000
6545 IFCH>37THENCK=7:IFCK=7THENG
OTO9000
6550 IFCH>29THENCK=8:IFCK=8THENG
OTO9000
6555 IFCH>20THENCK=9:IFCK=9THENG
OTO9000
6560 IFCH<=20THENCK=10:IFCK=10TH
ENGOTO9000
9000 TA=AA+AB+AC+AD+AE+AF+AG+AH+
AI+AJ+AK+AL+AM+AO+AP+AQ+AR+AY+AU
+AV+AW+AX+AZ+BA+BB+BC+BD+BE+BF+B
G
9001 TB=BH+BI+BJ+BQ+BU+BV+BX+BY+
BZ+CA+CB+CC+CD+CE+CF+CG+CI+CK
9003 TC=TA+TB
9005 CLS:PRINT@164,"YOUR SCORE =
"TC"POINTS"
9008 IFTC>120THENPRINT@228,"YOU
ARE AN EXCEPTIONALLY          LOW
HEALTH RISK":GOTO9800
9010 IFTC>100THENPRINT@228,"YOU
ARE A VERY LOW HEALTH         RISK
":GOTO9800
9012 IFTC>90THENPRINT@228,"YOU A
RE A LOW HEALTH RISK":GOTO9800
9014 IFTC>80THENPRINT@228,"YOU A
RE A SATISFACTORY             HEALT
H RISK":GOTO9800
9016 IFTC>70THENPRINT@228,"YOU A
RE AN UNSATISFACTORY          HEALT
H RISK":GOTO9800
9018 IFTC>60THENPRINT@228,"YOU A
RE A POOR HEALTH RISK":GOTO9800
9020 IFTC>50THENPRINT@228,"YOU A
RE A DANGEROUS HEALTH         RISK"
:GOTO9800
9025 IFTC<=50THENPRINT@228,"YOU
ARE AN EXTREMELY              DANG
EROUS HEALTH RISK":GOTO9800
9100 BM=100+(5*(BN-60)):RETURN
9200 CLS
9210 PRINT@161,"MY SYSTOLIC BLOO
D PRESSURE (UP-PER NUMBER) IS -"
9215 INPUT"     ANSWER";BW
9220 IFBW>179THENBX=-5:IFBX=-5TH
ENGOTO9500
9222 IFBW>159THENBX=-3:IFBX=-3TH
ENGOTO9500
9224 IFBW>149THENBX=-2:IFBX=-2TH
ENGOTO9500
9226 IFBW>139THENBX=-1:IFBX=-1TH
ENGOTO9500
9228 IFBW>134THENBX=1:IFBX=1THEN
GOTO9500
9230 IFBW>129THENBX=4:IFBX=4THEN
GOTO9500
9232 IFBW>124THENBX=6:IFBX=6THEN
GOTO9500
9234 IFBW>120THENBX=7:IFBX=7THEN
GOTO9500
9236 IFBW>117THENBX=8:IFBX=8THEN
GOTO9500
9238 IFBW>114THENBX=9:IFBX=9THEN
GOTO9500
9240 IFBW<=114THENBX=10:IFBX=10T
HENGOTO9500
9300 CLS
9310 PRINT@161,"MY SYSTOLIC BLOO
D PRESSURE (UP-PER NUMBER) IS -"
9315 INPUT"     ANSWER";BW
9320 IFBW>176THENBY=-5:IFBY=-5TH
ENGOTO9600
9322 IFBW>156THENBY=-3:IFBY=-3TH
ENGOTO9600
9324 IFBW>146THENBY=-2:IFBY=-2TH
ENGOTO9600
9326 IFBW>136THENBY=-1:IFBY=-1TH
ENGOTO9600
9328 IFBW>131THENBY=1:IFBY=1THEN
GOTO9600
9330 IFBW>126THENBY=4:IFBY=4THEN
GOTO9600
```

```
9332 IFBW>121THENBY=6:IFBY=6THEN
GOTO9600
9334 IFBW>118THENBY=7:IFBY=7THEN
GOTO9600
9336 IFBW>115THENBY=8:IFBY=8THEN
GOTO9600
9338 IFBW>112THENBY=9:IFBY=9THEN
GOTO9600
9340 IFBW<=112THENBY=10:IFBY=10T
HENGOTO9600
9400 CLS
9410 PRINT@161,"MY SYSTOLIC BLOO
D PRESSURE (UP-PER NUMBER) IS -"
9415 INPUT"     ANSWER";BW
9420 IFBW>183THENBZ=-5:IFBZ=-5TH
ENGOTO9700
9422 IFBW>163THENBZ=-3:IFBZ=-3TH
ENGOTO9700
9424 IFBW>153THENBZ=-2:IFBZ=-2TH
ENGOTO9700
9426 IFBW>143THENBZ=-1:IFBZ=-1TH
ENGOTO9700
9428 IFBW>138THENBZ=1:IFBZ=1THEN
GOTO9700
9430 IFBW>133THENBZ=4:IFBZ=4THEN
GOTO9700
9432 IFBW>128THENBZ=6:IFBZ=6THEN
GOTO9700
9434 IFBW>124THENBZ=7:IFBZ=7THEN
GOTO9700
9436 IFBW>121THENBZ=8:IFBZ=8THEN
GOTO9700
9438 IFBW>117THENBZ=9:IFBZ=9THEN
GOTO9700
9440 IFBW<=118THENBZ=10:IFBZ=10T
HENGOTO9700
9500 CLS
9510 PRINT@164,"MY DIASTOLIC BLO
OD PRESSURE (LOWER NUMBER) IS -"
9515 INPUT"     ANSWER";BW
9520 IFBW>98THENCA=-5:IFCA=-5THE
NGOTO5800
9522 IFBW>95THENCA=-3:IFCA=-3THE
NGOTO5800
9524 IFBW>92THENCA=-2:IFCA=-2THE
NGOTO5800
9526 IFBW>89THENCA=-1:IFCA=-1THE
NGOTO5800
9528 IFBW>87THENCA=1:IFCA=1THENG
OTO5800
9530 IFBW>83THENCA=4:IFCA=4THENG
OTO5800
9532 IFBW>79THENCA=6:IFCA=6THENG
OTO5800
9534 IFBW>74THENCA=7:IFCA=7THENG
OTO5800
9536 IFBW>69THENCA=8:IFCA=8THENG
OTO5800
9538 IFBW>67THENCA=9:IFCA=9THENG
```


Double Density Software

COLOR TERM +PLUS+ Look at these features: Operates at 110-19200 BAUD: Half or Full Duplex; 1 or 2 stop bits; odd, even, or no parity; send and receive BASIC & Machine Language programs; word wrap; Edit Buffer; Code & Decode buffer using a user defined key word; save and load buffer to tape. +PLUS+ much more! 16k or 32k Reg. or Ext. BASIC. PRICE **$29.95** (tape)*

TAPENAME **Tapename** searches tape and stores the name of any program or file. You can print the information to the screen, printer or tape. Also checks for load errors. 4k, 16k, or 32k Reg. or Ext. BASIC. PRICE **$7.95** (tape)*

COLOR DISK SAVER Saves a disk to tape. Reloads disk from saved tape. Also has tape verify command! 32k Ext. BASIC Req. PRICE **$12.95** (tape)**

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CURSOR II Hate that blinking cursor? Tired of seeing the computer print "OK" after your program just bombed? **Cursor II** changes the cursor to a solid, non-flashing red. Enter any message up to 200 characters in length. Your message will be displayed instead of "OK". 4k, 16k, or 32k Reg. or Ext. BASIC. PRICE **$4.95** (tape)*

SUPER PEEKER This is a BASIC program that will allow the user to explore the inside of the color computer. Explore the possibilities with **Super Peeker.** 16k or 32k Ext. BASIC Req. PRICE **$9.95** (tape)*

DISK DIRECTORY Prints disk directory to screen and/or printer. Free with purchase of any program. You must ask for it to get it free. 16k or 32k Ext. BASIC Req. PRICE **$2.95** (tape)

MODEM CHESS Use your **Modem** and your **Color Computer** to play chess *over the phone!* Has high res color graphics board and pieces. Make your move, select a message to send, press a button—seconds later your opponent's board is updated automatically. Has audio alerts, lets you know when a move is being made. 16k or 32k Ext. BASIC Req. PRICE **$39.95** (tape) (Disk 32k only)**

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CLONE ATTACK Blast those nasties as they appear! 3 skill levels and 9 levels of difficulty. Uses high res color graphics. Joysticks required. 16k or 32k Ext. BASIC only. PRICE **$15.95** (tape) (Disk 32k only)
[Special 32k version $2.00 extra]

MOON BASE INVASION Nuclear bombs are nearing your cities! Can you stop them before they reach you? 16k or 32k Ext. BASIC Req. High res graphics. PRICE **$12.95** (tape)

COLOR LIFE This one shows births and deaths, as well as generation number and population levels. 16k or 32k Ext. BASIC Req. (FAST!) PRICE **$12.95** (tape)**

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We are looking for quality software. If you have a program you think is a winner, send it to us. If it meets our standards, you will be paid TOP royalties.

*Machine Language.
**Machine Language Subroutines.

```
OTO5800
9540 IFBW<=67THENCA=10:IFCA=10TH
ENGOTO5800
9600 CLS
9610 PRINT@164,"MY DIASTOLIC BLO
OD PRESSURE (LOWER NUMBER) IS -"
9615 INPUT"     ANSWER";BW
9620 IFBW>98THENCB=-5:IFCB=-5THE
NGOTO5800
```



```
9622 IFBW>94THENCB=-3:IFCB=-3THE
NGOTO5800
9624 IFBW>89THENCB=-2:IFCB=-2THE
NGOTO5800
9626 IFBW>87THENCB=-1:IFCB=-1THE
NGOTO5800
9628 IFBW>85THENCB=1:IFCB=1THENG
OTO5800
9630 IFBW>82THENCB=4:IFCB=4THENG
OTO5800
9632 IFBW>77THENCB=6:IFCB=6THENG
OTO5800
9634 IFBW>72THENCB=7:IFCB=7THENG
OTO5800
9636 IFBW>67THENCB=8:IFCB=8THENG
OTO5800
9638 IFBW>65THENCB=9:IFCB=9THENG
OTO5800
9640 IFBW<=65THENCB=10:IFCB=10TH
ENGOTO5800
9700 CLS
9710 PRINT@164,"MY DIASTOLIC BLO
OD PRESSURE (LOWER NUMBER) IS -"
9715 INPUT"     ANSWER";BW
9720 IFBW>98THENCC=-5:IFCC=-5THE
NGOTO5800
9722 IFBW>96THENCC=-3:IFCC=-3THE
NGOTO5800
9724 IFBW>94THENCC=-2:IFCC=-2THE
NGOTO5800
9726 IFBW>91THENCC=-1:IFCC=-1THE
NGOTO5800
9728 IFBW>87THENCC=1:IFCC=1THENG
OTO5800
9730 IFBW>85THENCC=4:IFCC=4THENG
OTO5800
9732 IFBW>81THENCC=6:IFCC=6THENG
OTO5800
9734 IFBW>75THENCC=7:IFCC=7THENG
OTO5800
9736 IFBW>72THENCC=8:IFCC=8THENG
OTO5800
9738 IFBW>67THENCC=9:IFCC=9THENG
OTO5800
9740 IFBW<=67THENCC=10:IFCC=10TH
ENGOTO5800
9800 PRINT:PRINT:INPUT"     CONTI
NUE(<ENTER> KEY)";ZZ$
9810 CLS
9820 PRINT"     THE SCORE YOU AC
HIEVE ON   THIS TEST IS NOT A GU
ARANTEE    THAT YOU ARE ABSOLUTE
LY A 'HIGH'OR 'LOW' HEALTH RISK,

 SINCE SUCHSCORES ARE A RESULT O
F STATISTI-CAL AVERAGES."
9830 PRINT"YOUR SCORE WILL, HOWE
VER, GIVE  YOU A GOOD IDEA OF HO
W YOU COM- PARE WITH OTHERS."
9840 PRINT:PRINT:PRINT:PRINT:PRI
NT:PRINT:INPUT"CONTINUE(<ENTER>
KEY)";ZZ$:IFZZ$="!"THENGOTO9880
9880 CLS:PRINT"  IF YOUR SCORE T
OTAL IS BELOW  71. THIS IS REASO
N FOR YOU TO   MAKE A DRAMATIC C
HANGE IN YOUR  LIFE-STYLE."
9882 PRINT"     ASK YOUR DOCTOR F
OR A COM-  PLETE PHYSICAL EXAMIN
ATION AND  FOR SPECIFIC RECOMMEN
DATIONS ON DIET, EXERCISE, WAYS
OF ALLEVIA-TING STRESS AND CHANG
ING OTHER  HARMFULL HABITS."
9888 PRINT:PRINT:PRINT:PRINT:PRI
NT:INPUT"CONTINUE(<ENTER> KEY)";
ZZ$:IFZZ$=" "THENGOTO9890
9890 CLS:PRINT"     WITH A SCORE
 OF 71-80 YOU  ARE JUST MARGINAL
LY BENEATH A   SATISFACTORY WELL
NESS LEVEL,AND IT SHOULD TAKE RE
LATIVELY LITTLEEFFORT TO RAISE T
HAT FIGURE TO  THE SATISFACTORY
RANGE."
9892 PRINT"     REVIEW YOUR ANSW
ERS TO THE HEALTH EXAM TO IDENTI
FY THOSE   AREAS YOU CAN IMPROVE
."
9895 PRINT:PRINT:PRINT:PRINT:INP
UT"DO YOU WISH TO RETAKE EXAM
   (Y OR N)";ZZ$:IFZZ$="Y"THENGO
TO5ELSEGOTO9899
9899 CLS:PRINT@164,"THANK YOU AN
D GOOD HEALTH!":END
```

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Business...

Bells And Whistles For Our Simple Word Processor

16K ECB



By Barry Becker

The heart of this program is based on a modified version of Oscar Millican's word processor (***A Simple Way To Paper Your Words,* the Rainbow, May, 1982**). The modifications include memory storage of text, the ability to store and retrieve text on cassette, a simple edit function and a prompting program that is friendly and forgiving. The original text of this article was written using this program.

The program contains a menu offering eight modes of operation. The first three modes allow you to enter text from the keyboard. In these modes you may select immediate output to the printer. This causes each line entry to be output to the printer *before* it is saved in memory. In this way, the printer is used as a scratch pad, printing all inputs—good and bad. Final clean text is output to the printer by selecting mode four.

Both modes four and five provide for output to the printer. Mode five, however, will print from tape without affecting the current contents of memory. This allows merging of old and new text and exceeds memory capacity.

Modes six and seven direct the program to fully prompting tape *SAVE* and *LOAD* routines. Motor and audio are turned on to allow positioning of the tape without a hassle.

Mode eight is the edit mode. While it does not compare to the type of edit functions available on elaborate word processors, it does let you retype any previously entered line of text, whether from keyboard or from tape.

You can get a screen listing of the text at any time by returning to the menu and selecting mode eight. To continue text entry, select mode two after returning to the menu again. The text output to screen is not formatted, but shows the line number and tab value. You need to use the *SHIFT*/@ to freeze the text on the screen and then press another key to continue.

If you have used Oscar Millican's word processor, then the display that greets you in the text entry modes will be quite familiar. This program uses only the one-column portion of the original program. One major difference is that after each line entry, you are given a choice to *save* or *redo* the line. For the expert typist, this is likely to be a drag. For me, it is an absolute necessity! Another difference is that line numbering is continuous and does not reset when the margin is reset.

When entering mode 2, the last line of text is displayed and can be retyped or saved. This wasn't intentional: But it does allow the last entered line to be edited by returning to the menu and selecting mode 2 again instead of going through the edit mode.

One of the few things this program will not forgive is the wrong entry in response to the *Meximum Number Of Pages* request. It's very important to respond correctly. This input determines the number of strings in the *DIM*ensioned arrays. If you select the maximum number of pages allowed for double-spaced text and then input mostly single-spaced text, you may run out of string storage space. If you do, the program will crash and could lose all your text!

There is no special formatting for double-spaced text entry. You simply enter blank lines after each line of text. You can have some single-spaced text (such as letterheads, etc.) even if you've chosen the meximum number of of pages shown for double-spaced text. The program sets aside enough string storage space for full pages of text at 80 characters per line. For single spacing, it assumes 5280 characters per page. For double spacing, it assumes 2640. With just a little direction, you can prevent crashes.

The program takes up less than 4K bytes of memory. If you have only 16K, then you must do a *PCLEAR1* before running in order to have enough string space available for at least one page of text. If you have 32K, you needn't do a *PCLEAR1* unless you have more than three pages of single- or six pages of double-spaced text to enter.

The program will not crash if you run out of line numbers. It warns you when you have less than 10 lines left. If you repeatedly ignore the warnings, it returns you to the menu when you have no more *DIM*ensioned strings available. You may then save the current text on tape and start a new text entry.

I believe this program is error-free. It has not failed during the compilation of this article, including several intermediate tape storings.

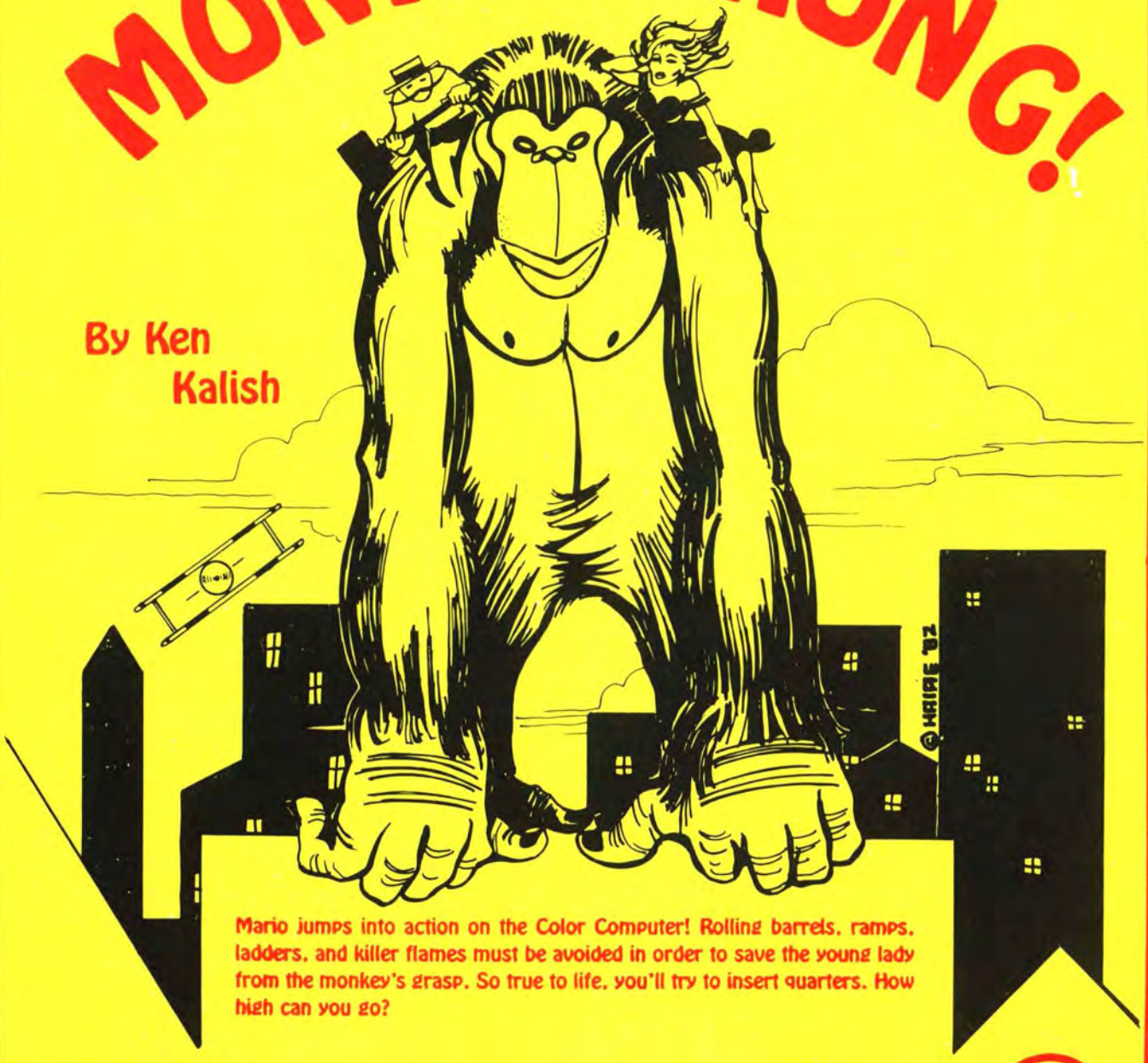
This program is nothing without Oscar Millican's program and I thank him for submitting it and *the Rainbow* for printing it.

The Listing:

```
10 ' FALK/MILLICAN/BECKER WORD P
ROCESSOR
20 PR=0:CLS:PRINT" ALL MEMORY DA
TA WILL BE LOST      WHEN THE PRO
GRAM IS ENDED.":PRINT:PRINT" SEL
ECT MODE-":PRINT"  <1>-ENTER INI
TIAL TEXT          <2>-ADD TO ST
ORED TEXT          <3>-START NEW
 TEXT ENTRY        <4>-PRINT TEX
T FROM MEMORY"
30 PRINT"  <5>-PRINT TEXT FROM T
APE          <6>-SAVE TEXT TO TAPE
             <7>-LOAD TAPE FILE TO
 MEMORY      <8>-EDIT STORED TEXT"
40 INPUT" MODE";MM:IFMM=1ANDJ>0T
HENPRINT" INITIAL TEXT ALREADY E
NTERED!":GOTO40
50 IFMM=4ANDJ>0THEN370ELSEIFMM=5
THEN410ELSEIFMM=6ANDJ>0THEN390
60 IFJ=0AND(MM=2ORMM=4ORMM=6ORMM
=8)THENPRINT" NO TEXT NOW IN MEM
ORY!":GOTO40
70 IFJ>0AND(MM=3ORMM=7)THENCLS:P
RINT"     IF THIS MODE IS EXERCIS
ED,      ALL CURRENTLY STORED DA
TA              WILL BE LOST!":PR
INT:LINE INPUT" TO CONTINUE, TYP
E 'OK'-          TO GO BACK TO ME
NU,<ENTER>-";OK$:IFOK$<>"OK"THEN
20
80 IFMM=2THENCLS:GOTO170
90 IFMM=8THENCLS:LINEINPUT" FOR
SCREEN LISTING OF STORED     TEXT
, HIT <ENTER>, OTHERWISE     TYPE
 'E'-";Q$:IFQ$="E"THEN490ELSEFOR
X=1TON:PRINT"LINE"X;TAB(9)"TAB"M
(X);TAB(16)":"H$(X):NEXTX:GOTO49
0
```

MONKEY KONG!

By Ken Kalish



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```
100 IFMM<10RMM>8THEN40
110 IFMM=7THENCLEAR200:MM=7ELSEC
LEAR200
120 CLS:PRINT"  YOU HAVE ENOUGH
MEMORY TO       STORE ABOUT";.1*
INT(10*((MEM-1000)/6000));"PAGES
 OF"
130 PRINT"  SINGLE-SPACED TEXT O
R";.1*INT(10*((MEM-1000)/3400))
140 PRINT"  PAGES OF DOUBLE SPAC
ED TEXT.":PRINT
150 IFMM=7THENCLEAR(MEM-1000-660
*(MEM-1000)/3400):MM=7ELSECLEAR(
MEM-1000-660*(MEM-1000)/3400)
160 PRINT:PRINT" ENTER MAXIMUM N
UMBER OF PAGES   TO BE STORED (S
EE ABOVE)";:INPUTP:ST=INT(P*66):
DIMH$(ST):DIMM(ST):IFMM=7THENJ=0
:N=0:GOTO410
170 PRINT:INPUT" IMMEDIATE OUTPU
T TO PRINTER";PR$:IFLEFT$(PR$,1)
="Y"THENPR=1
180 IFMM=2THEN500ELSEN=0
190 CLS:LINEINPUT" SET MARGIN (0
 TO 79):  ";M$:M=VAL(M$):IFM>790R
M<0THEN190
200 CLS:POKE1329-2*M,60:PRINT"
  MARGINS SET AT"M"SPACES.":IFM>
39THENCLS:PRINT"  LEFT MARGIN SE
T AT"M".TYPE     BETWEEN MARKERS
 AND <ENTER>.":POKE1329-M,60:GOT
0210ELSEPRINT"TYPE UP TO"80-2*M"
CHARACTERS BETWEEN      MARKERS
AND <ENTER>."
210 PRINT" TO JUSTIFY, ENTER SPA
CES FROM    LAST SYMBOL TO RIGHT
 MARKER.     ENTER ^ TO RESET MA
RGIN.       **ENTER @ TO RETURN T
O MENU**":X=79-2*M:IFM>39THENX=7
9-M
220 N$=" ":L=4:PRINT@353,"";:IFJ
>0THENPRINT"*LINE"J;TAB(11)"ENTE
RED AS FOLLOWS*"
230 IFA$="^"THENA$=H$(J):AA=1:GO
TO250
240 IFJ>0ANDM<=39THENPOKE1519-2*
M,30ELSEIFJ>0ANDM>39THENPOKE1519
-M,30
250 PRINTA$:PRINT@224,"";:IFJ=0O
RAA=1THENAA=0:GOTO290
260 PRINT@224," ":PRINT" TO SAVE
 LINE"J", TYPE 'S'-"
270 PRINT" TO REDO LINE"J", TYPE
 'C'-";:LINEINPUTSC$:IF(SC$="S"O
RSC$="s")ANDMM=8THEN90ELSEPRINT@
224," ":PRINT:PRINT:IFSC$="C"ORS
C$="c"THENPRINT@353," ** NOW RE-
TYPING LINE"J"**":J=J-1:IFMM<>8T
HENN=N-1
280 IFSC$<>"C"ANDSC$<>"c"ANDSC$<
>"S"ANDSC$<>"s"THEN260ELSEIFJ=ST
 THEN20
290 PRINT@224,"";:IFM>39THENPOKE
1329-M,60ELSEPOKE1329-2*M,60
300 LINEINPUT">";A$:IFA$="^"THEN
190ELSEIFA$="@"THEN20
310 IFRIGHT$(A$,1)=" "THENA$=LEF
T$(A$,X):GOTO360
320 IFPR=1THENPRINT#-2,TAB(M)A$
330 J=J+1:M(J)=M:H$(J)=A$:IFJ<ST
-9THEN350ELSEPRINT@0," ":PRINT"*
**********CAUTION**********
  YOU CAN ONLY ENTER ANOTHER"
340 PRINT"  "ST-J"LINES OF TEXT
IN CURRENT      PROGRAM.  ENTER
<@> TO END      THE CURRENT TEXT
 OR PRESS       <ENTER> TO CONTI
NUE:      ";:LINEINPUTQ$:IFQ$="@
"THEN20
350 IFMM<>8THENN=N+1:GOTO200ELSE
200
360 B=INSTR(L,A$,N$):C$=LEFT$(A$
,B):E$=RIGHT$(A$,X-B):D$=C$+N$:A
$=D$+E$:L=LEN(D$)+4:GOTO310
370 CLS:PRINT" SET PRINTER TO TO
P OF PAGE OR   AS NEEDED, AND PR
ESS <ENTER>.";:LINEINPUTXX$:FORY
=1TON:PRINTTAB(M(Y))H$(Y):PRINT#
-2,TAB(M(Y))H$(Y):NEXT:GOTO20
380 CLS:PRINT" FILE CLOSED":PRIN
T:PRINT:PRINT" TO TAPE AGAIN, EN
TER <T>,       OTHERWISE PRESS <
ENTER>";:INPUTT$:IFT$<>"T"THEN20
390 AUDIOON:MOTORON:CLS:LINEINPU
T" POSITION TAPE TO BLANK SECTIO
N  AND PRESS <ENTER>:";QQ$:PRINT
:MOTOROFF:PRINT" PRESS PLAY AND
RECORD AND      INPUT FILE NAME
-":LINEINPUT" (8 CHARACTERS MAX.
):";FF$
400 MOTORON:FORX=1TO1000:NEXT:OP
EN"O",#-1,FF$:FORY=1TON:M$=STR$(
M(Y)):F$="."+H$(Y):PRINTH$(Y):PR
INT#-1,M$:PRINT#-1,F$:NEXT:CLOSE
#-1:GOTO380
410 CLS:AUDIOON:MOTORON:PRINT"
  ***TO ABORT THIS MODE***
  ***JUST PRESS <ENTER>***":PRIN
T:IFMM=5THENPRINT"  SET PRINTER
TO TOP OF PAGE":PRINT
420 LINEINPUT" REWIND TAPE OR SE
T TO START OF  FILE AND ENTER <T
>-";QQ$:MOTOROFF:IFQQ$<>"T"THEN2
0ELSEPRINT:PRINT"      PRESS PLA
Y AND ENTER            FILE NAME
:";:LINEINPUTFF$:IFFF$=""THEN20E
LSEOPEN"I",#-1,FF$
430 IFEOF(-1)THEN480
```

```
440 INPUT#-1,M$:M=VAL(M$):INPUT#
-1,F$:IFLEN(F$)>1THENF$=RIGHT$(F
$,LEN(F$)-1)ELSEF$=""
450 IFMM=7THENJ=J+1:N=N+1:H$(J)=
F$:M(J)=M
460 PRINTTAB(M)F$:IFMM=5THENPRIN
T#-2,TAB(M)F$
470 GOTO430
480 CLOSE#-1:PRINT:PRINT:PRINT"F
ILE CLOSED":PRINT:LINEINPUT" <EN
TER> TO RETURN TO MENU-";QQ$:GOT
020
490 PRINT:PRINT"*HIT <ENTER> TO
RETURN TO MENU*":PRINT:LINEINPUT
" ENTER LINE NUMBER TO EDIT-";J$
:IFJ$=""THEN20ELSEJJ=VAL(J$):IFJ
J>N ORJJ<1THENPRINT:PRINT" NO SU
CH LINE NUMBER!":GOTO490ELSEJ=JJ
500 IFMM=2THENJ=N
510 A$=H$(J):M=M(J):GOTO200
```

Graphics...

The Eyes Have It With This Program

By Rich Dersheimer



What would a Graphics Issue be without looking at all the forms and shapes generated by the Color Computer?

Poor ol' CoCo! Thousands and thousands of people spend hour after hour staring at you, and you never get a chance to stare back.

Well, now you can. With this short program, your CoCo can keep an eye on you.

The Listing:

```
100 GOTO 114
101 CLS0:Y=96:Z=1
102 FOR X=83 TO 173 STEP 30
103 PMODE1,Z:PCLS2:Z=Z+2
104 CIRCLE(X,Y),50,3,1.2
105 PAINT (X,Y),3,3
106 CIRCLE(128,Y),120,4,.4
107 CIRCLE(X+8,80),3,2
108 PAINT(1,1),1,4:NEXT X
109 PLAY"T255L25504"
110 RN=RND(4)-1:P=1+RN*2
111 PMODE1,P:SCREEN1,0
112 PLAY"05BAGFEDC04BAGFEDC"
113 GOTO 110
114 PCLEAR8:GOTO 101
```

Continued From Page 6

Editor's Notes...

PRINT #-2,

Third Anniversary issue.

Both of us had planned to bind 3D glasses inside the magazine. Since it was a special issue for *80 Micro*, we decided not to bind in the glasses. Wayne Green and I agreed that the 3D concept is an interesting one and, while neither program is *true* 3D, we feel it is an interesting avenue some of you might want to explore and, perhaps, offer a contribution on in the future. We would be very interested in seeing one. And, to Wayne and *80 Micro*, Happy Third Anniversary!

By the way (and this really should not be a "by the way," because it is a preview of one of the most significant announcements we have ever made in *the Rainbow*), we have been interested for quite some time in the concept of an "electronic magazine." I suppose that interest began when we worked for United Press International many years ago and were fortunate enough to be in on the planning stages of the program which led to the driving of UPI's newswires by computer for the first time.

At any rate, we hope that next month we will have a full-scale announcement of plans which are even now moving along quite quickly for an electronic edition of *the Rainbow*. As we see it, you will be able to access *the Rainbow* via modem through a bulletin board service, send letters to the editor through the same bulletin board, renew or enter subscriptions and transfer *Rainbow On Tape* programs through this electronic version of the magazine.

Tentative name of this service is *The Rainbow Connection*, which is not to be confused with the software firm in Minneapolis named Rainbow Connection Software. And, *The Rainbow Connection* will, if all goes well, also have one of the largest data bases of existing information—from both *the Rainbow* and *Connection 80 of Woodhaven* that is in existance for the Color Computer, TDP-100 Computer and Dragon-32 Computer.

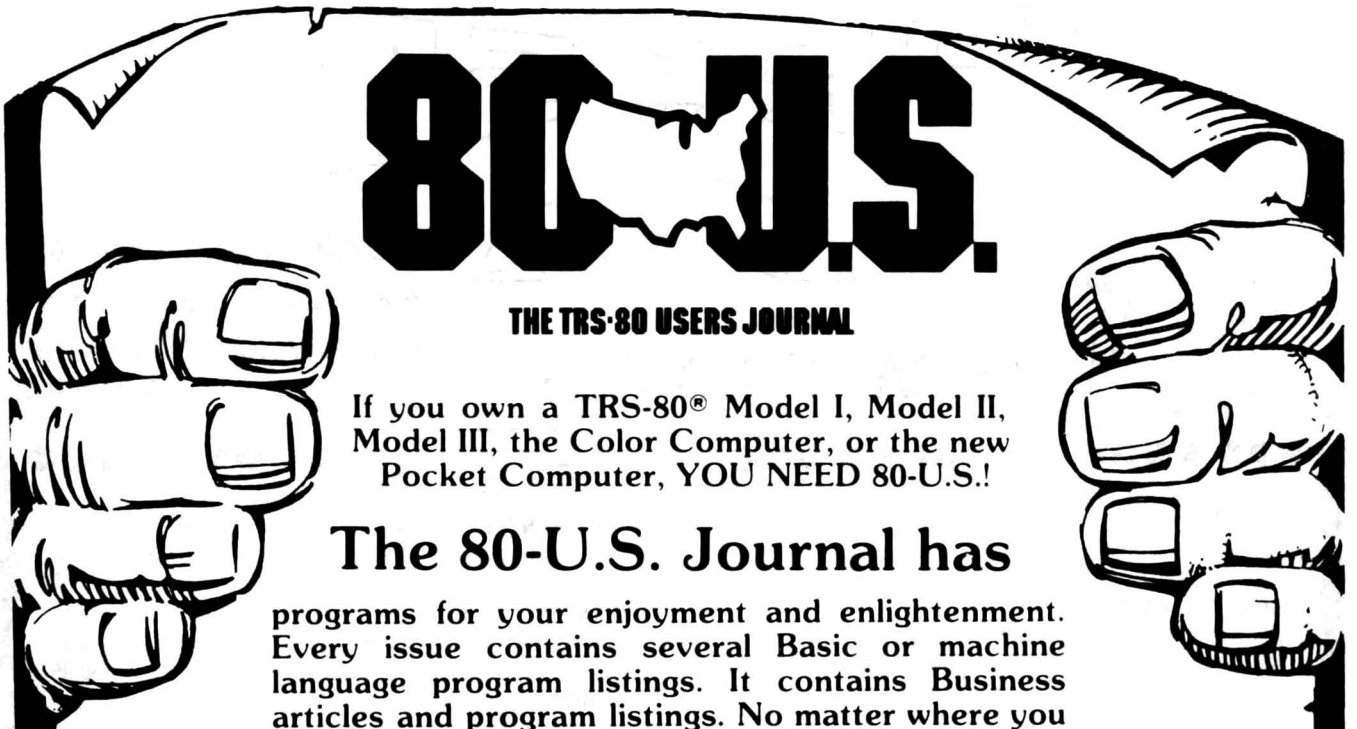
I suppose this is all more than a hint, but there will be more details next month. We believe this will be the first full magazine to be offered via electronic means.

I guess the end of this month's epic is going to circle around to the beginning again. As I was thinking about *the Rainbow*, I was also thinking about what has happened in the CoCo world in the last year.

The thing that has impressed me the most is the growth of the support for CoCo (more on this in a moment) in the past year. The quality of programs, the diversity of programs, the level of documentation has grown remarkably. So has the quality of books, hardware and other things which became available for our favorite computer. We are fortunate that the people at Radio Shack built a quality machine which can take advantage of all the skills of so many people. I know we will be seeing more and even better things coming in the months ahead. I hope you will support their efforts when you have a chance—and, again, please mention *the Rainbow* when you do make an inquiry or a purchase. That helps us secure the advertising that allows us to contiue to grow and offer you an even better magazine each month.

Finally . . . I am sure many of you are wondering about the return of the nickname CoCo to these pages. I suppose the primary reason is that almost everyone seems to like it. And, in addition, with the advent of the TDP-100 (as well as the Dragon-32 in Great Britain), the term "80" really doesn't apply. So, it's "CoCo," "80C," or "Color Computer"—whichever you prefer.

—Lonnie Falk



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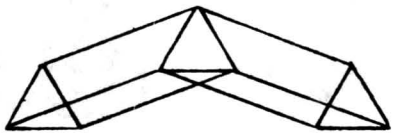
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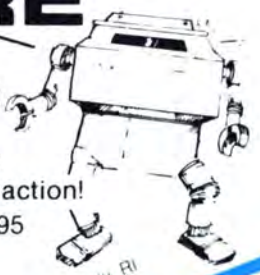
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